96M4301o

Single Board Computer

User's Manual

Version 1.0

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Appendix A

Appendix B

How to Use This Manual

The manual describes how to configure your 96M4301o system to meet various operating requirements. It is divided into five chapters, with each chapter addressing a basic concept and operation of Single Host Board.

Chapter 1 : System Overview. Presents what you have in the box and give you an overview of the product specifications and basic system architecture for this series model of single host board.

Chapter 2 : Hardware Configuration. Shows the definitions and locations of Jumpers and Connectors that you can easily configure your system.

Chapter 3 : System Installation. Describes how to properly mount the CPU, main memory and Compact Flash to get a safe installation and provides a programming guide of Watch Dog Timer function.

Chapter 4 : BIOS Setup Information. Specifies the meaning of each setup parameters, how to get advanced BIOS performance and update new BIOS. In addition, POST checkpoint list will give users some guidelines of trouble-shooting.

Chapter 5 : Troubleshooting. Provides various useful tips to quickly get the 96M4301o running with success. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

The content of this manual is subject to change without prior notice. These changes will be incorporated in new editions of the document. **DSM** may make supplement or change in the products described in this document at any time.

Updates to this manual, technical clarification, and answers to frequently asked questions will be shown on the following web site : www.DSM.AG

Chapter 1
System Overview

1.1 Introduction

Along with Intel introduced its first PCI Express chipset, many applications are longing for this latest interface. PCI Express, a serial type I/O interface such as Ethernet and USB that we had already familiar for many years. A basic link of PCI Express consists of dual unidirectional differential links, implemented as a transmit pair and receive pair and a link must support at least one lane. To scalable bandwidth, a link may aggregate multiple lanes. In PCI Express revision 1.0a, the lane can up to 32 lanes width and denoted PCI Express x32. Bandwidth of one lane is 2.5Gbps per direction; therefore, it is 80Gbps for 32 lanes.

However, full-size SHB (Single Host Board) specification of PICMG such as PICMG 1.0 and 1.2 are not support PCI Express as external expansion interface. As a result, the only way that can adopt this interface is on-board devices. On-board devices that utilized PCI Express interface are limited to some categories and space on-board. To leverage this new interface, PICMG announces PICMG 1.3, so called SHB Express. The new standard SHB takes components side as ISA card for layout consideration (same as PICMG 1.0), supports 20 PCI Express lanes and four 32-bit/66MHz PCI as external expansion.

DSM presented its SHB according to PICMG 1.3 that uses Intel longevity supported PCI Express chipset - 915GV & ICH6. The board, 96M4301o equipped single Pentium 4 or Celeron D processor, DDR2 memory, integrated graphics engine, one IDE channel, four SATA port, eight USB 2.0 ports and dual Gigabit Ethernet port.

96M4301o features:

- Support socket 478 type, 533/800MHz FSB, Pentium 4 and Celeron D processor that generates lower thermal than LGA 775 package and more reliable thermal solution
- Two DIMM sockets provide up to 2GB DDR2 400/533 system memory expansion capability in dual channel
- 915GV integrated graphics engine – GMA 900
- Equipped dual Gigabit Ethernet
- Audio in/out, Watch-dog timer, Type II CompactFlash socket, 8 USB 2.0 ports (two ports dedicated to keyboard & mouse)
- Support four PCI Express x1, and four PCI expansion via backplane (additional one PCI Express x16 by project based that change GMCH to 915G)

1.2 Check List

The 96M4301o package should cover the following basic items:

- ✓ One 96M4301o single host board
- ✓ One dual Serial ports cable kit
- ✓ One Parallel port cable kit
- ✓ One FDC cable
- ✓ One IDE cable
- ✓ Two 7-pin SATA signal cables
- ✓ One Installation Resources CD-Title
- ✓ One booklet of 96M4301o

Optional: One bracket with PS/2 keyboard and mouse

If any of these items is damaged or missing, please contact your vendor and keep all packing materials for future replacement and maintenance.

1.3 Product Specification

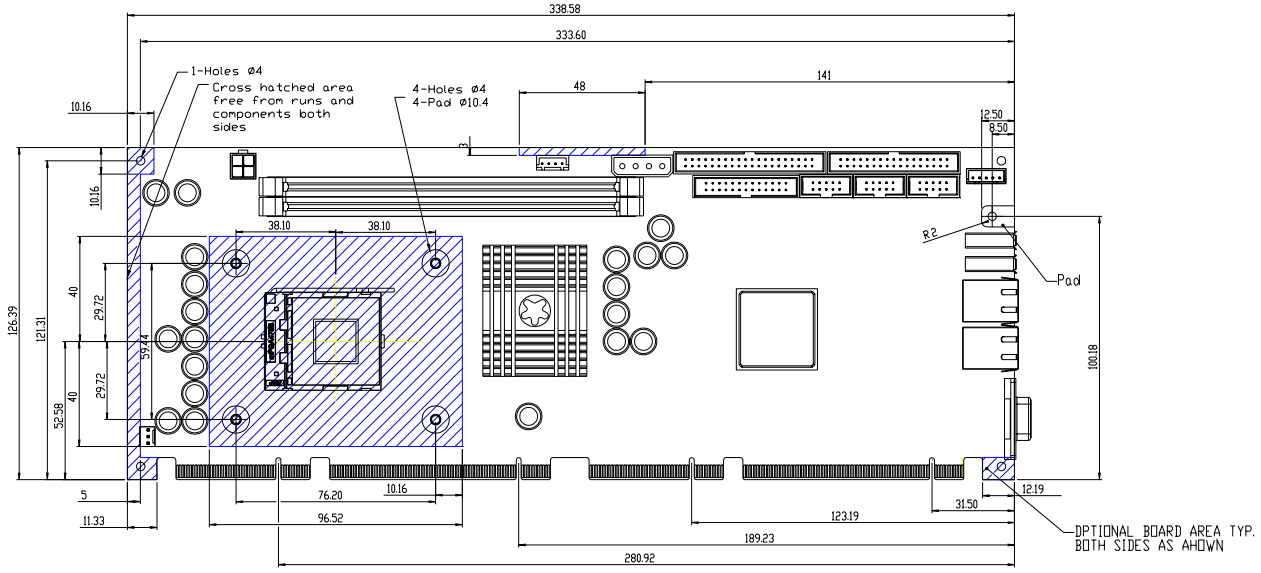
- **Main processor**
  - Intel® Pentium® 4/Celeron D Processor
  - FSB: 800/533MHz
- **BIOS**
  Phoenix (Award) system BIOS with 4Mb Flash ROM with easy upgrade function ACPI, DMI, Green function and Plug and Play Compatible
- **Main Memory**
  - Support single channel DDR2 memory interface
  - Non-ECC, non-buffered DIMMs only
  - Two DIMM sockets support 533/400 DDR2-SDRAM up to 2GB System Memory
- **L2 Cache Memory**
  Built-in Processor
- **Chipset**
  Intel 915GV GMCH and ICH6 chipset
- **Bus Interface**
  - Follow PICMG 1.3 Rev 1.0 standard (PCI Express and PCI)
  - Support four PCI Express x1 through backplane
  - Support for PCI devices through backplane
  - Project based to support PCI Express x16 by changing GMCH to Intel 915G
- **IDE Interface**
  Support one enhanced IDE port up to two HDD devices with PIO mode 4 and Ultra DMA/33/66/100 mode transfer and Bus Master feature

- **Floppy Drive Interface**
  Support one FDD port up to two floppy drives and 5-1/4"(360K, 1.2MB), 3-1/2" (720K, 1.2MB, 1.44MB, 2.88MB) diskette format and 3-mode FDD
- **Serial Ports**
  Support two high-speed 16C550 compatible UARTs with 16-byte T/R FIFOs
- **IR Interface**
  Support one 6-pin header for serial Standard Infrared wireless communication
- **Parallel Port**
  Support one parallel port with SPP, EPP and ECP modes
- **USB Interface**
  Support eight USB (Universal Serial Bus) ports for high-speed I/O peripheral devices
- **PS/2 Mouse and Keyboard Interface**
  Support one 8-pin connector for external PS/2 keyboard/mouse connection
- **Auxiliary I/O Interfaces**
  System reset switch, external speaker, Keyboard lock and HDD active LED, etc
- **Real Time Clock/Calendar (RTC)**
  Support Y2K Real Time Clock/Calendar with battery backup for 7-year data retention
- **Watchdog Timer**
  - Support WDT function through software programming for enable/disable and interval setting
  - Generate system reset
- **Compact Flash**
  - True IDE mode, compatibles with the ATA/ATAPI-4 specification
  - One Type II CF socket on secondary IDE channel for supporting up to 1GB memory
  - Support DMA mode
  - Bootable for no drives on primary channel
- **On-board VGA**
  - GMCH integrated graphics, 333MHz core frequency; share system memory up to 224MB for system with greater than or equal to 512MB of system memory
- **On-board Ethernet LAN**
  Marvell PCI interface based Gigabit Ethernet to support RJ-45 connector
- **High Driving GPIO**
  Support 8 programmable high driving GPIO
- **Cooling Fans**
  Support one 4-pin header for CPU and one 3-pin header for system
- **System Monitoring Feature**
  Monitor CPU temperature, system temperature and major power sources, etc

- **Bracket**
  Support dual Ethernet port with 2 indicators, dual USB ports and one CRT port
- **Outline Dimension (L X W):**
  338.5mm (13.33") X 122mm (4.8")
- **Power Requirements:**
  - +12V@ 7.64A
  - +5V @ 4.45A
  - Test configuration:
    - CPU: Intel(R) Pentium 4 2.8GHZ(FSB: 800 / L2 cache: 1024KB)
    - Memory: Apacer DDR2 512MBx2 UNB PC4300 CL4
    - Primary Master IDE HDD: Seagate ST320011A
    - OS: Microsoft Windows 2000 Professional + SP4
    - Test Programs: Burning Test V4.0
    - Run Time: 10 minutes
- **Operating Temperature:**
  -5°C ~ 60°C (23°F ~ 140°F)
- **Storage Temperature:**
  -20°C ~ 80°C
- **Relative Humidity:**
  0% ~ 95%, non-condensing

DSM® Computer

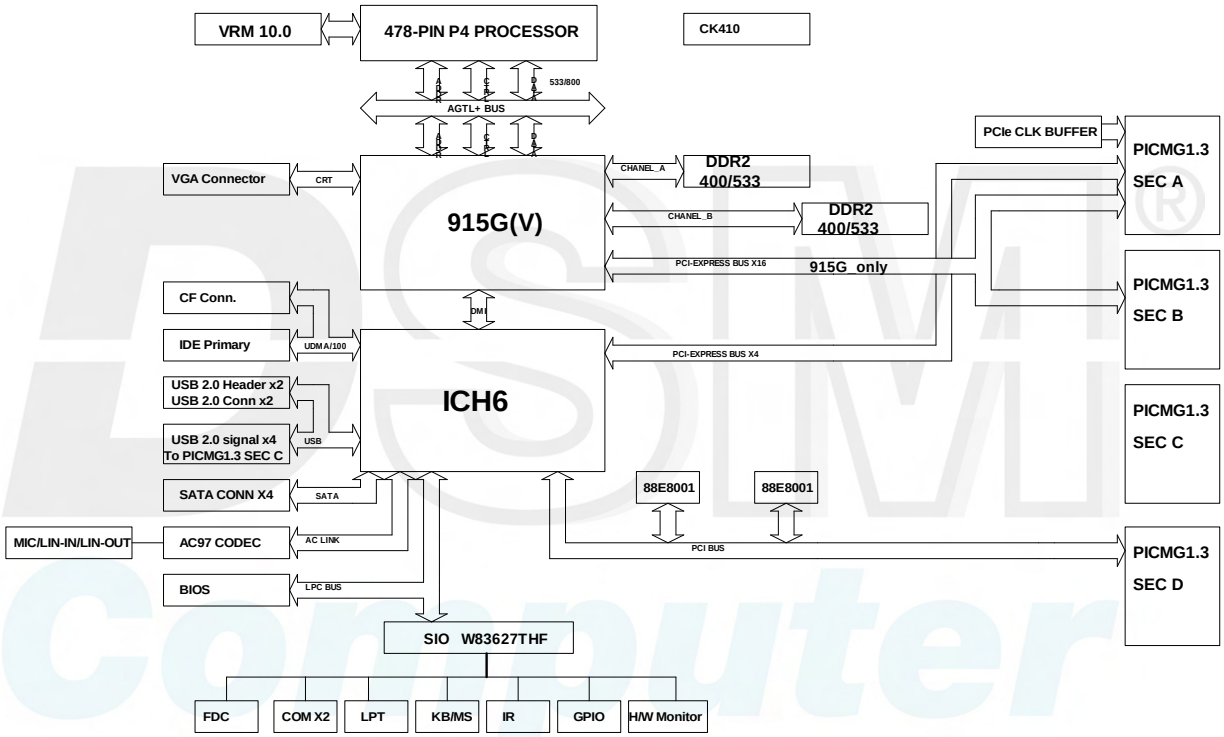
1.3.1 Mechanical Drawing



1.4 System Architecture

The 964301o includes Intel chipset 915GV supports Pentium 4/Celeron D processor, DDR2 SDRAM, 2D/3D graphics display and ICH6 supports PCI Express x1 & PCI bus interface, APM, ACPI compliant power management, USB port, SMBus communication, Ultra DMA 33/66/100 IDE channel and SATA ports.

Super I/O chip, W83627THF is responsible for PS/2 keyboard/mouse, UARTs, FDC, hardware monitor, Parallel, Watch Dog Timer and Infrared interface.



System Block Diagram

Chapter 2
Hardware Configuration

This chapter indicates jumpers', headers' and connectors' locations. Users may find useful information related to hardware settings in this chapter. The default settings are indicated with a star sign (★).

2.1 Jumper Setting

For users to customize 96M4301o's features. In the following sections, **Short** means covering a jumper cap over jumper pins; **Open** or **N/C** (Not Connected) means removing a jumper cap from jumper pins. Users can refer to Figure 2-1 for the Jumper locations.

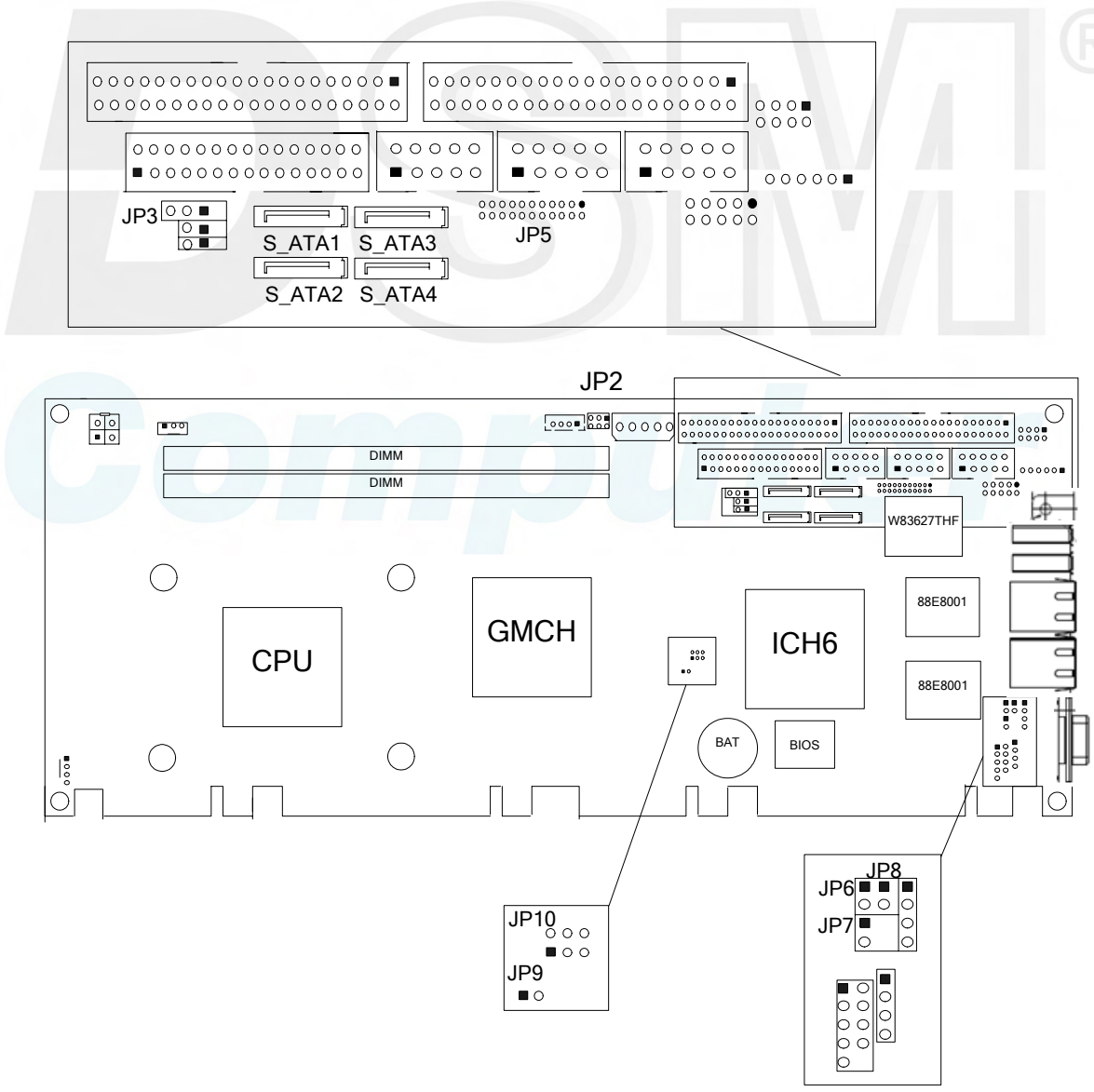


Figure 2-1 96M4301o Jumper Location

JP2、JP8: AT/ATX Power Selection

JP2、JP8	Function
JP2: 1-3,2-4 Short JP8: Short	AT Power
JP2: 3-5, 4-6 Short JP8: Open	ATX Power ★

JP3: CMOS Clear

JP3	Function
1-2 Short	Normal Operation ★
2-3 Short	Clear CMOS Contents

JP5: COM2 Interface Selection

JP5	Function
5-6,9-11,10-12,15-17,16-18 Short	RS-232 ★
3-4,7-9,8-10,13-15,14-16,21-22 Short	RS-422
1-2,7-9,8-10,19-20 Short	RS-485

JP6: System reset

JP6	Function
Short	Reset
Open	Normal ★

JP9 and JP10: Power(3.3v) Selection

JP9	Function
JP9: Short JP10:1-2,3-4,5-6 Short	Backplane supply(3.3v)
JP9: Open JP10:1-2,3-4,5-6 Open	Board supply(3.3v) ★

2.2 Connector Allocation

I/O peripheral devices are connected to the interface connectors (Figure 2-2)

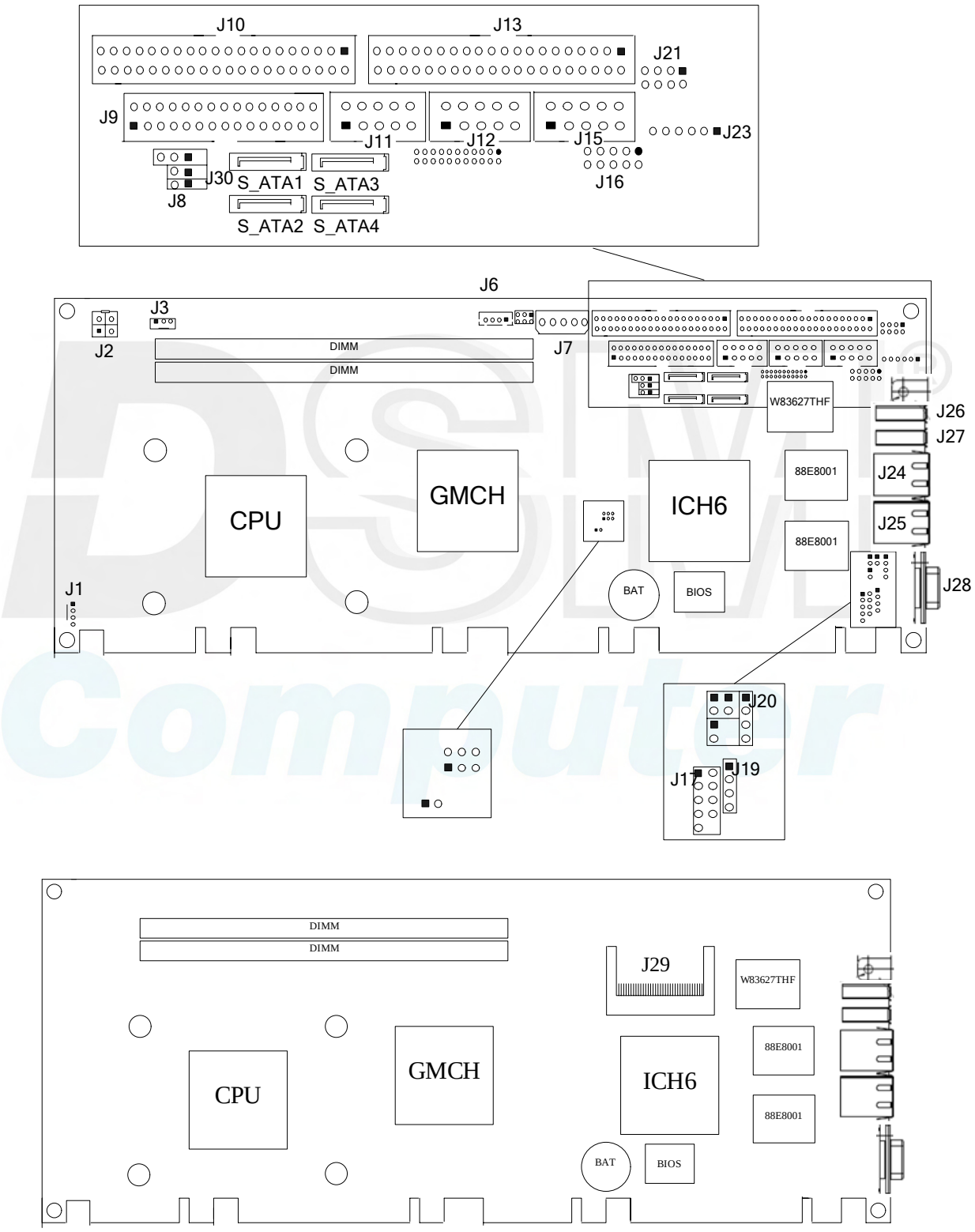


Figure 2-2 96M4301o Connectors Location

Connector Function List

Connector	Function	Remark
J1	CPU fan connector	
J2	+12V power connector	
J3	Fan connector	
J6	AT Power Emulation	
J7	+5V & +12V power connector	
J8+J30	HDD LED +Power LED	
J9	Printer port connector	
J10	IDE connector	
J11	COM1 connector	
J12	COM2 connector	
J13	FDD connector	
J15	8-bit GPIO connector	
J16	USB port2 & port3 connector	
J17	Audio connector	
J19	CD-IN connector	
J20	PC-Speaker connector	
J21	PS/2, K/B and Mouse connector	
J23	IR connector	
J24	GIGA_LAN1 connector	
J25	GIGA_LAN2 connector	
J26	USB port 1 connector	
J27	USB port 0 connector	
J28	CRT connector	
J29	Compact flash card socket	
DIMM1	Channel A DDR2 connector	
DIMM2	Channel B DDR2 connector	
S_ATA1	SATA port3	
S_ATA2	SATA port2	
S_ATA3	SATA port1	
S_ATA4	SATA port0	

J1: CPU fan connector

Pin No.	Signal Description
1	GND
2	+12V
3	SENSE
4	Control

J2: +12V power connector

Pin No.	Signal Description	Pin No.	Signal Description
1	GND	3	+12V
2	GND	4	+12V

J3: Fan connector

Pin No.	Signal Description
1	GND
2	+12V
3	SENSE

J6: AT Power Emulation (pin3 and pin4 short) connector

Pin No.	Signal Description
1	ATX Power Ok
2	5VSB
3	PS_ON#
4	GND

Note:
J6 pin 3 and pin4 are AT Power Emulation function. "AT Power Emulation" means the 96M4301o is able to be auto power up once power cord is plugged in ATX power supply. However, user need set BIOS setup menu "PWRON after PWR FAIL" to "ON" if you need auto power up function.

J7: +5V & +12V power connector

Pin No.	Signal Description
1	+12V
2	Ground
3	Ground
4	+5V

J8+J30: HDD and power LED connector

PIN No.	Signal Description	PIN No.	Signal Description
1	5Vsb pull up (power LED+)	2	Power LED-
3	3V pull up (HDD LED+)	4	HDD LED-

J9: Printer port connector

Pin No.	Signal Description	Pin No.	Signal Description
1	Strobe#	14	Auto Form Feed#
2	Data0	15	Error#
3	Data1	16	Initialization#
4	Data2	17	Printer Select In#
5	Data3	18	Ground
6	Data4	19	Ground
7	Data5	20	Ground
8	Data6	21	Ground
9	Data7	22	Ground
10	ACK#	23	Ground
11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Printer Select	26	N/C

J10: IDE connector

Pin No.	Signal Description	Pin No.	Signal Description
1	RESET#	2	Ground
3	Data7	4	Data8
5	Data6	6	Data9
7	Data5	8	Data10
9	Data4	10	Data11
11	Data3	12	Data12
13	Data2	14	Data13
15	Data1	16	Data14
17	Data0	18	Data15
19	Ground	20	N/C
21	DMA REQ	22	Ground
23	IOW#	24	Ground
25	IOR#	26	Ground
27	IOCHRDY	28	Pull-down
29	DMA ACK#	30	Ground
31	INT IRQ	32	N/C
33	SA1	34	PDIAG-
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	Active	40	Ground

J11 & J12: COM1 & COM2 connector

Pin No.	Signal Description
1	Data Carrier Detect
2	Receive Data
3	Transmit Data
4	Data Terminal Ready
5	Ground
6	Data Set Ready
7	Request To Send
8	Clear To Send
9	Ring Indicator
10	N/C

J13: FDD connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Ground	2	Density Select 0
3	Ground	4	N/C
5	Ground	6	N/C
7	Ground	8	INDEX#
9	Ground	10	Motor ENA#
11	Ground	12	N/C
13	Ground	14	Drive Select A#
15	Ground	16	N/C
17	Ground	18	Direction#
19	Ground	20	Step#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 0#
27	Ground	28	Write Protect#
29	N/C	30	Read Data#
31	Ground	32	Head Select#
33	N/C	34	Disk Change#

J15: 8-bit GPIO

PIN No.	Signal Description	PIN No.	Signal Description
1	GPIO10	2	GPIO11
3	GPIO12	4	GPIO13
5	Ground	6	GPIO14
7	GPIO15	8	GPIO16
9	GPIO17	10	5V

J16: USB port2 & port3

PIN No.	Signal Description	PIN No.	Signal Description
1	USB power (5V)	2	Shield Ground
3	USB DATA A-	4	Ground
5	USB DATA A+	6	USB DATA B+
7	Ground	8	USB DATA B-
9	Shield ground	10	USB power (5V)

J17: Audio connector

PIN No.	Signal Description	PIN No.	Signal Description
1	MIC	2	Ground
3	Line in channel L	4	Ground
5	Line in channel R	6	Ground
7	Line out channel L	8	Ground
9	Line out channel R	10	NC

J19: CD-IN connector

PIN No.	Signal Description
1	CD-IN Left
2	CD-Ground
3	CD-Ground
4	CD-IN Right

J20: PC-Speaker connector

PIN No.	Signal Description
1	Speaker Signal
2	N/C
3	Ground
4	+5V

J21: PS/2 K/B and Mouse connector

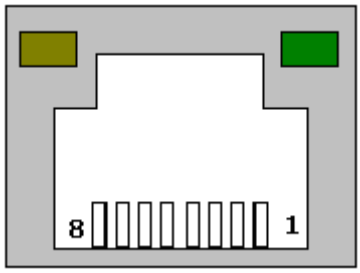
PIN No.	Signal Description	PIN No.	Signal Description
1	Keyboard data	2	Mouse data
3	KB/MS ground	4	KB/MS VCC (+5V)
5	Keyboard clock	6	Mouse clock
7	NC (key)	8	NC (key)

J23: IR connector

PIN No.	Signal Description
1	+5V
2	Reserved
3	IRRX
4	Ground
5	IRTX
6	NC (Key pin)

J24、J25: GIGA_LAN connector

RJ-45 PIN No.	Signal Description
1	MDIA+
2	MDIA-
3	MDIB+
4	MDIC+
5	MDIC-
6	MDIB-
7	MDID+
8	MDID-



J26、J27: USB port connector

PIN No.	Signal Description
1	USB power (+5V)
2	USBD-
3	USBD+
4	USB Ground

J28: CRT connector

Pin No.	Signal Name	Pin No.	Signal Name
1	RED	2	GREEN
3	BLUE	4	IDO
5	Ground	6	Ground
7	Ground	8	Ground
9	+5V	10	Ground
11	ID1	12	DDCDATA
13	HSYNC	14	VSYNC
15	DDCCLK		

J29: (solder side) CF socket

PIN No.	Signal Description	PIN No.	Signal Description
1	Ground	26	NC
2	Data 3	27	Data 11
3	Data 4	28	Data 12
4	Data 5	29	Data 13
5	Data 6	30	Data 14
6	Data 7	31	Data 15
7	Select 0	32	Select 1
8	Ground	33	NC
9	Ground	34	IO Read
10	Ground	35	IO Write
11	Ground	36	Pull Up to +5V
12	Ground	37	IRQ 14
13	+5V	38	+5V
14	Ground	39	Pull down
15	Ground	40	NC
16	Ground	41	Reset
17	Ground	42	IORDY
18	SA2	43	NC
19	SA1	44	Pull Up to +5V
20	SA0	45	IDE Active
21	Data 0	46	Pull Up to +5V
22	Data 1	47	Data 8
23	Data 2	48	Data 9
24	NC	49	Data 10
25	NC	50	Ground

S_ATA1、S_ATA2、S_ATA3&S_ATA4 : SATA port

PIN No.	Signal Description
1	Ground
2	SATA TX+
3	SATA TX-
4	Ground
5	SATA RX-
6	SATA RX+
7	Ground

PICMG 1.3 RC1.0 gold finger pin assignment table

PIN No.	Signal Description	PIN No.	Signal Description
B1	SM bus clock	A1	SM bus data
B2	GND	A2	GND
B3	Reserved	A3	Reserved
B4	Reserved	A4	Reserved
B5	Reserved	A5	PCI-Express wake signal#
B6	Power button	A6	PCI PME#
B7	ATX power good	A7	PS_ON#
B8	Reset button	A8	PCI reset
B9	Reserved	A9	NC
B10	Reserved	A10	PCI-Express configure pin
B11	Reserved	A11	GND
B12	GND	A12	Reserved
B13	PCI-Ex1 channel 0 TX+	A13	GND
B14	PCI-Ex1 channel 0 TX-	A14	GND
B15	GND	A15	PCI-Ex1 channel 0 RX+
B16	GND	A16	PCI-Ex1 channel 0 RX-
B17	PCI-Ex1 channel 1 TX+	A17	GND
B18	PCI-Ex1 channel 1 TX-	A18	GND
B19	GND	A19	PCI-Ex1 channel 1 RX+
B20	GND	A20	PCI-Ex1 channel 1 RX-
B21	PCI-Ex1 channel 2 TX+	A21	GND
B22	PCI-Ex1 channel 2 TX-	A22	GND
B23	GND	A23	PCI-Ex1 channel 2 RX+
B24	GND	A24	PCI-Ex1 channel 2 RX-
B25	PCI-Ex1 channel 3 TX+	A25	GND
B26	PCI-Ex1 channel 3 TX-	A26	GND
B27	GND	A27	PCI-Ex1 channel 3 RX+
B28	GND	A28	PCI-Ex1 channel 3 RX-
B29	CLOCK0+	A29	GND
B30	CLOCK0-	A30	GND
B31	GND	A31	CLOCK1+
B32	Reserved	A32	CLOCK1-
B33	CLOCK2+	A33	GND
B34	CLOCK2-	A34	GND
B35	GND	A35	CLOCK3+
B36	Reserved	A36	CLOCK3-
B37	CLOCK4+	A37	GND
B38	CLOCK4-	A38	GND
B39	GND	A39	Reserved
B40	Reserved	A40	Reserved

B41	Reserved	A41	GND
B42	Reserved	A42	GND
B43	GND	A43	Reserved
B44	GND	A44	Reserved
B45	PCI-Ex16 channel 0 TX+	A45	GND
B46	PCI-Ex16 channel 0 TX-	A46	GND
B47	GND	A47	PCI-Ex16 channel 0 RX+
B48	GND	A48	PCI-Ex16 channel 0 RX-
B49	PCI-Ex16 channel 1 TX+	A49	GND
B50	PCI-Ex16 channel 1 TX-	A50	GND
B51	GND	A51	PCI-Ex16 channel 1 RX+
B52	GND	A52	PCI-Ex16 channel 1 RX-
B53	PCI-Ex16 channel 2 TX+	A53	GND
B54	PCI-Ex16 channel 2 TX-	A54	GND
B55	GND	A55	PCI-Ex16 channel 2 RX+
B56	GND	A56	PCI-Ex16 channel 2 RX-
B57	PCI-Ex16 channel 3 TX+	A57	GND
B58	PCI-Ex16 channel 3 TX-	A58	GND
B59	GND	A59	PCI-Ex16 channel 3 RX+
B60	GND	A60	PCI-Ex16 channel 3 RX-
B61	PCI-Ex16 channel 4 TX+	A61	GND
B62	PCI-Ex16 channel 4 TX-	A62	GND
B63	GND	A63	PCI-Ex16 channel 4 RX+
B64	GND	A64	PCI-Ex16 channel 4 RX-
B65	PCI-Ex16 channel 5 TX+	A65	GND
B66	PCI-Ex16 channel 5 TX-	A66	GND
B67	GND	A67	PCI-Ex16 channel 5 RX+
B68	GND	A68	PCI-Ex16 channel 5 RX-
B69	PCI-Ex16 channel 6 TX+	A69	GND
B70	PCI-Ex16 channel 6 TX-	A70	GND
B71	GND	A71	PCI-Ex16 channel 6 RX+
B72	GND	A72	PCI-Ex16 channel 6 RX-
B73	PCI-Ex16 channel 7 TX+	A73	GND
B74	PCI-Ex16 channel 7 TX-	A74	GND
B75	GND	A75	PCI-Ex16 channel 7 RX+
B76	GND	A76	PCI-Ex16 channel 7 RX-
B77	Reserved	A77	GND
B78	+3.3V	A78	+3.3V
B79	+3.3V	A79	+3.3V
B80	+3.3V	A80	+3.3V
B81	+3.3V	A81	+3.3V
B82	Reserved	A82	Reserved
D1	5VSB	C1	5Vsb

D2	GND	C2	Reserved
D3	PCI-Ex16 channel 8 TX+	C3	GND
D4	PCI-Ex16 channel 8 TX-	C4	GND
D5	GND	C5	PCI-Ex16 channel 8 RX+
D6	GND	C6	PCI-Ex16 channel 8 RX-
D7	PCI-Ex16 channel 9 TX+	C7	GND
D8	PCI-Ex16 channel 9 TX-	C8	GND
D9	GND	C9	PCI-Ex16 channel 9 RX+
D10	GND	C10	PCI-Ex16 channel 9 RX-
D11	Reserved	C11	Reserved
D12	GND	C12	Reserved
D13	PCI-Ex16 channel 10 TX+	C13	GND
D14	PCI-Ex16 channel 10 TX-	C14	GND
D15	GND	C15	PCI-Ex16 channel 10 RX+
D16	GND	C16	PCI-Ex16 channel 10 RX-
D17	PCI-Ex16 channel 11 TX+	C17	GND
D18	PCI-Ex16 channel 11 TX-	C18	GND
D19	GND	C19	PCI-Ex16 channel 11 RX+
D20	GND	C20	PCI-Ex16 channel 11 RX-
D21	PCI-Ex16 channel 12 TX+	C21	GND
D22	PCI-Ex16 channel 12 TX-	C22	GND
D23	GND	C23	PCI-Ex16 channel 12 RX+
D24	GND	C24	PCI-Ex16 channel 12 RX-
D25	PCI-Ex16 channel 13 TX+	C25	GND
D26	PCI-Ex16 channel 13 TX-	C26	GND
D27	GND	C27	PCI-Ex16 channel 13 RX+
D28	GND	C28	PCI-Ex16 channel 13 RX-
D29	PCI-Ex16 channel 14 TX+	C29	GND
D30	PCI-Ex16 channel 14 TX-	C30	GND
D31	GND	C31	PCI-Ex16 channel 14 RX+
D32	GND	C32	PCI-Ex16 channel 14 RX-
D33	PCI-Ex16 channel 15 TX+	C33	GND
D34	PCI-Ex16 channel 15 TX-	C34	GND
D35	GND	C35	PCI-Ex16 channel 10 RX+
D36	GND	C36	PCI-Ex16 channel 10 RX-
D37	Reserved	C37	GND
D38	Reserved	C38	Reserved
D39	GND	C39	GND
D40	GND	C40	GND
D41	GND	C41	GND
D42	GND	C42	GND
D43	GND	C43	GND
D44	+12V	C44	+12V

D45	+12V	C45	+12V
D46	+12V	C46	+12V
D47	+12V	C47	+12V
D48	+12V	C48	+12V
D49	+12V	C49	+12V
F1	USBD4+	E1	GND
F2	USBD4-	E2	GND
F3	GND	E3	USBD5+
F4	GND	E4	USBD5-
F5	USBD6+	E5	GND
F6	USBD6-	E6	GND
F7	GND	E7	USBD7+
F8	GND	E8	USBD7-
F9	USBOC4#	E9	GND
F10	GND	E10	USBOC5#
F11	USBOC6#	E11	GND
F12	GND	E12	USBOC6#
F13	SATA T1+	E13	GND
F14	SATA T1-	E14	GND
F15	GND	E15	SATA R1+
F16	GND	E16	SATA R1-
F17	SATA T3+	E17	GND
F18	SATA T3-	E18	GND
F19	GND	E19	SATA R3+
F20	GND	E20	SATA R3-
F21	Reserved	E21	GND
F22	Reserved	E22	GND
F23	GND	E23	Reserved
F24	GND	E24	Reserved
F25	Reserved	E25	GND
F26	Reserved	E26	GND
F27	GND	E27	Reserved
F28	GND	E28	Reserved
F29	Reserved	E29	GND
F30	Reserved	E30	GND
F31	Reserved	E31	Reserved
F32	Reserved	E32	Reserved
F33	Reserved	E33	Reserved
F34	Reserved	E34	GND
F35	Reserved	E35	GND
F36	GND	E36	Reserved
F37	GND	E37	Reserved

F38	Reserved	E38	GND
F39	Reserved	E39	GND
F40	GND	E40	Reserved
F41	GND	E41	Reserved
F42	+3.3V	E42	+3.3V
F43	+3.3V	E43	+3.3V
F44	+3.3V	E44	+3.3V
F45	+3.3V	E45	+3.3V
F46	+3.3V	E46	+3.3V
F47	+3.3V	E47	+3.3V
F48	+3.3V	E48	+3.3V
F49	+3.3V	E49	+3.3V
F50	+3.3V	E50	+3.3V
F51	GND	E51	GND
F52	GND	E52	GND
F53	GND	E53	GND
F54	GND	E54	GND
F55	GND	E55	GND
F56	GND	E56	GND
F57	GND	E57	GND
F58	GND	E58	GND
F59	+5V	E59	+5V
F60	+5V	E60	+5V
F61	+5V	E61	+5V
F62	+5V	E62	+5V
F63	GND	E63	GND
F64	GND	E64	GND
F65	GND	E65	GND
F66	GND	E66	GND
F67	GND	E67	GND
F68	GND	E68	GND
F69	GND	E69	GND
F70	GND	E70	GND
F71	GND	E71	GND
F72	GND	E72	GND
F73	+12V	E73	+12V
F74	+12V	E74	+12V
F75	+12V	E75	+12V
F76	+12V	E76	+12V
F77	+12V	E77	+12V
F78	+12V	E78	+12V
F79	+12V	E79	+12V
F80	+12V	E80	+12V
F81	+12V	E81	+12V

F82	+12V	E82	+12V
H1	PIRQB#	G1	PIRQ#A
H2	PIRQD#	G2	PIRQ#C
H3	GND	G3	VIO
H4	PREQ#3	G4	PGNT#3
H5	PREQ#2	G5	PGNT#2
H6	PCI RESET#	G6	PGNT#1
H7	PREQ#1	G7	PGNT#0
H8	PREQ#0	G8	SERR#
H9	Pull down to GND	G9	+3.3V
H10	GND	G10	GND
H11	GND	G11	GND
H12	PCICLK2	G12	PCICLK3
H13	GND	G13	+3.3V
H14	PCICLK0	G14	PCICLK1
H15	+3.3V	G15	GND
H16	AD31	G16	GND
H17	AD29	G17	+3.3V
H18	Pull down to ground	G18	AD30
H19	AD27	G19	AD28
H20	AD25	G20	GND
H21	GND	G21	AD26
H22	C/BE#3	G22	AD24
H23	AD23	G23	+3.3V
H24	GND	G24	AD22
H25	AD21	G25	AD20
H26	AD19	G26	Pull down to ground
H27	+5V	G27	AD18
H28	AD17	G28	AD16
H29	C/BE#2	G29	GND
H30	PCI_PRST#	G30	FRAME#
H31	IRDY#	G31	TRDY#
H32	DEVICE SELECT#	G32	+5V
H33	PCI LOCK#	G33	STOP#
H34	PCI ERR#	G34	GND
H35	GND	G35	C/BE#1
H36	PAR	G36	AD14
H37	Pull high to +3.3V	G37	GND
H38	GND	G38	AD12
H39	AD15	G39	AD10
H40	AD13	G40	GND
H41	GND	G41	AD9

H42	AD11	G42	C/BE#0
H43	AD8	G43	GND
H44	GND	G44	AD6
H45	AD7	G45	AD5
H46	AD4	G46	GND
H47	GND	G47	AD2
H48	AD3	G48	AD1
H49	AD0	G49	GND

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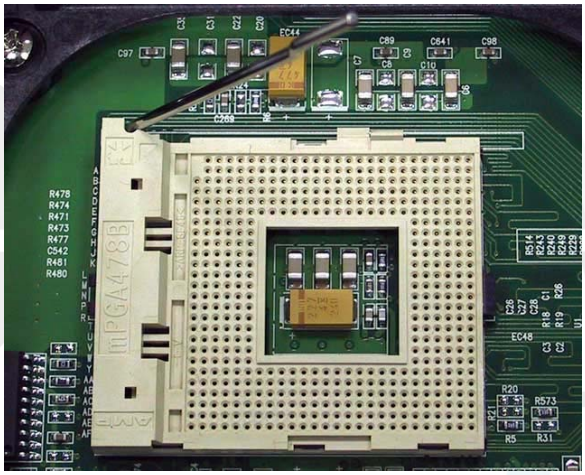
Chapter 3
System Installation

This chapter provides you with instructions to set up your system. The additional information is enclosed to help you set up onboard PCI device and handle WDT operation in software programming.

3.1 entium 4 Processor

Installing Socket 478 CPU

1) Lift the handling lever of CPU socket outwards and upwards to the other end.



2) Align the processor pins with pinholes on the socket. Make sure that the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's bevel end. Then press the CPU gently until it fits into place. If this operation is not easy or smooth, don't do it forcibly. You need to check and rebuild the CPU pin uniformly.

3) Push down the lever to lock processor chip into the socket once CPU fits.
4) Follow the installation guide of cooling fan or heat sink to mount it on CPU surface and lock it on the 478 socket.

J2: +12V Power input Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	GND	3	+12V
2	GND	4	+12V

Note:
You should know Pentium 4 processor need extra 12V power source. DON'T FORGET TO CONNECT 4pin 12V connector to J2!

Removing CPU

1) Unlock the cooling fan first.
2) Lift the lever of CPU socket outwards and upwards to the other end.
3) Carefully lifts up the existing CPU to remove it from the socket.
4) Follow the steps of installing a CPU to change to another one or place handling bar to close the opened socket.

Configuring System Bus

The 96M4301o supports socket 478 types, 533/800MHz FSB, Pentium 4 and Celeron D processor CPU, will automatically detect the CPU used. CPU speed of Intel Pentium 4 can be detected automatically.

3.2 Main Memory

Provides 2x 240-pin DIMM sockets support dual-channel DDR2 400/533 Non-ECC, non-buffered DIMMs only. The maximum memory size can be up to 2GB.Auto detecting memory clock according to BIOS CMOS settings.

Memory frequency / CPU FSB synchronization

The 96M4301o supports different memory frequencies depending on the CPU front side bus and the type of DDR II SDIMM.

CPU FSB	Memory Frequency
533MHz	533/400MHz
400MHz	400MHz

3.3 Installing the Single Board Computer

To install your 96M4301o into standard chassis or proprietary environment, you need to perform the following:

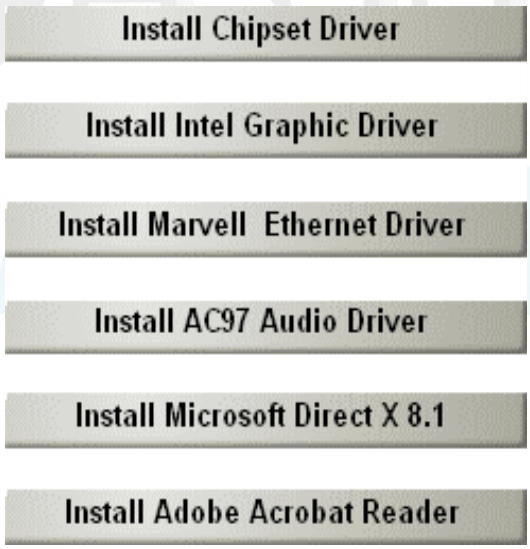
Step 1: Check all jumpers setting on proper position

Step 2: Install and configure CPU and memory module on right position

Step 3: Place your 96M4301o into the dedicated position in your system

Step 4: Attach cables to existing peripheral devices and secure it

Note:
Please refer to section 3-3-1 to 3-3-4 to install INF/VGA/LAN/Audio drivers.


Install Chipset Driver
Install Intel Graphic Driver
Install Marvell Ethernet Driver
Install AC97 Audio Driver
Install Microsoft Direct X 8.1
Install Adobe Acrobat Reader

3.3.1 hipset Component Driver

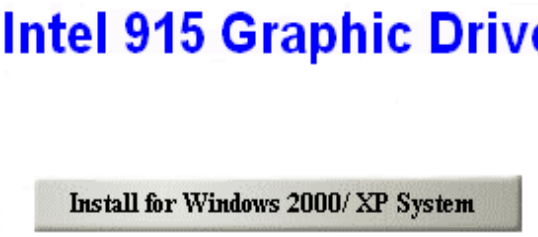
The chipset on 96M4301o is a new chipset that a few old operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows 2000/XP/Server 2003, please install its INF before any of other Drivers are installed. You can find very easily this chipset component driver in the 96M4301o CD-title. OS needs to modify according to OS that supported by Intel® 915GV & ICH6.

3.3.2 Intel Integrated Graphics GMCH Chip

Using GMCH High performance graphic integrated chipset is aimed to gain an outstanding graphic performance. Share system memory up to 224MB for system with greater than or equal to 512MB of system memory. This combination makes 96M4301o an excellent piece of multimedia hardware.

With no additional video adaptor, this onboard video will usually be the system display output. By adjusting the BIOS setting to disable on-board VGA, an add-on PCI VGA Card can take over the system display.

Please find Intel 915 Graphic driver in the 96M4301o CD-title. Drivers support Windows 2000 / XP.



3.3.3 On-board Gigabit Ethernet Controller

Drivers Support

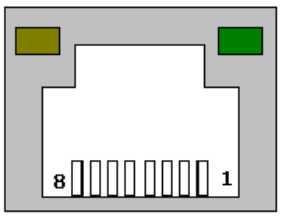
Please find Marvell 88E8001 driver in /Ethernet directory of 96M4301o CD-title. The drivers support Windows 2000 / XP.

LED Indicator (for LAN status)

The 96M4301o provides three LED indicators to report Ethernet interfaces status. Please refer to the table below as a quick reference guide.

J24 & J25: Ethernet port Connector

RJ-45 PIN No.	Signal Description
1	MDIA+
2	MDIA-
3	MDIB+
4	MDIC+
5	MDIC-
6	MDIB-
7	MDID+
8	MDID-

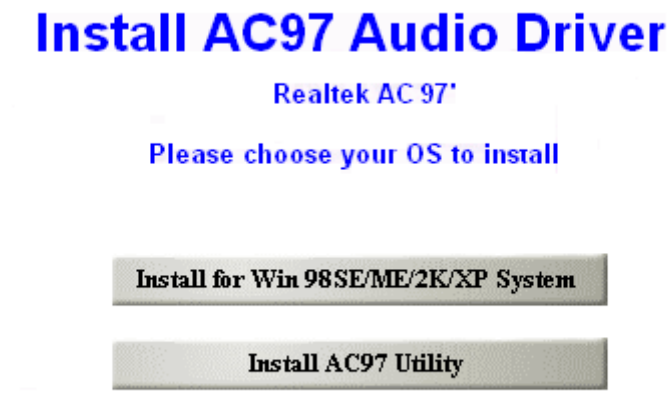


88E8001	Name of LED	Operation of Ethernet Port	
Green	LAN Linked & Active LED	Linked	Active (Blinking)
	LED display	**LAN speed**	
All Off		N/A	10 Mbps
Green	Speed LED	100 Mbps	N/A
Amber	Speed LED	1000 Mbps	N/A

Notes:
1) Only J24 support LAN wake up function.
2) J25 Boot OS LAN LED only then can act.

3.3.4 On-board AC-97 Audio Device

Please find Realtek AC'97 Audio driver in the 96M4301o CD-title. The drivers support Windows 98SE / ME / 2000 / XP, and AC97 Utility.


Install AC97 Audio Driver
Realtek AC 97'
Please choose your OS to install
Install for Win 98SE/ME/2K/XP System
Install AC97 Utility

J17: Audio Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	MIC	2	Ground
3	Line in channel L	4	Ground
5	Line in channel R	6	Ground
7	Line out channel L	8	Ground
9	Line out channel R	10	NC

Note:
The Reference Voltage on MIC signal offers 2.25V~2.75V with 5mA drive.

J19:CD-IN connector

PIN No.	Signal Description
1	CD-IN Left
2	CD-Ground
3	CD-Ground
4	CD-IN Right

3.4 Clear CMOS Operation

The following table indicates how to enable/disable CMOS Clear Function hardware circuit by putting jumpers at proper position.

JP3: RTC CMOS Clear Jumper Setting

JP3	Process Selection
1-2	Normal Operation ★
2-3	Clear CMOS Contents

To correctly operate CMOS Clear function, users must turn off the system, move JP3 jumper to short pin 2 and 3. To clear CMOS contents, please turn the power back on and turn it off again for AT system, or press the toggle switch a few times for ATX system. Move the JP3 back to 1-2 position (Normal Operation) and start the system. System will then produce a "CMOS Check Sum Error" message and hold up. Users may then follow the displayed message to load BIOS default setting.

3.5 WDT Function

The working algorithm of the WDT function can be simply described as a counting process. The Time-Out Interval can be set through software programming. The availability of the time-out interval settings by software or hardware varies from boards to boards.

The 96M4301o allows users control WDT through dynamic software programming. The WDT starts counting when it is activated. It sends out a signal to system reset or to non-maskable interrupt (NMI), when time-out interval ends. To prevent the time-out interval from running out, a re-trigger signal will need to be sent before the counting reaches its end. This action will restart the counting process.

A well-written WDT program should keep the counting process running under normal condition. WDT should never generate a system reset or NMI signal unless the system runs into troubles.

The related Control Registers of WDT are all included in the following sample program that is written in C language. User can fill a non-zero value into the Time-out Value Register to enable/refresh WDT. System will be reset after the Time-out Value to be counted down to zero. Or user can directly fill a zero value into Time-out Value Register to disable WDT immediately.

To ensure a successful accessing to the content of desired Control Register, the sequence of following program codes should be step-by-step run again when each register is accessed.

Additionally, there are maximum 2 seconds of counting tolerance that should be considered into user' application program. For more information about WDT, please refer to Winbond W83627THF data sheet.

There are two PnP I/O port addresses that can be used to configure WDT,

1) 0x2E:EFIR (Extended Function Index Register, for identifying CR index number)

2) 0x2F:EFDR (Extended Function Data Register, for accessing desired CR)

Below are some example codes, which demonstrate the use of WDT.

```
// Enter Extended Function Mode
outp(0x002E, 0x87);
outp(0x002E, 0x87);
// Assign Pin 89 to be a WDTO
outp(0x002E, 0x2B);
outp(0x002F, inp(0x002F) & 0xEF);
// Select Logic Device 8
outp(0x002E, 0x07);
outp(0x002F, 0x08);
// Active Logic Device 8
outp(0x002E, 0x30);
outp(0x002F, 0x01);
// Select Count Mode
outp(0x002E, 0xF5);
outp(0x002F, (inp(0x002F) & 0xF7) | (Count-mode Register & 0x08));
// Specify Time-out Value
outp(0x002E, 0xF6);
outp(0x002F, Time-out Value Register);
// Disable WDT reset by keyboard/mouse interrupts
outp(0x002E, 0xF7);
outp(0x002F, 0x00);
// Exit Extended Function Mode
outp(0x002E, 0xAA);
```

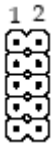
Definitions of Variables:

Value of Count-mode Register:
1) 0x00 -- Count down in seconds (Bit3=0)
2) 0x08 -- Count down in minutes (Bit3=1)
Value of Time-out Value Register:
1) 0x00 -- Time-out Disable
2) 0x01~0xFF -- Value for counting down

3.6 GPIO

The 96M4301o provides 4 input/output ports that can be individually configured to perform a simple basic I/O function. Users can configure each individual port to become an input or output port by programming register bit of I/O Selection. To invert port value, the setting of Inversion Register has to be made. Port values can be set to read or write through Data Register.

J15 : GPIO Connector from Super I/O



PIN No.	Signal Description	PIN No.	Signal Description
1	GPIO Port10	2	GPIO Port14
3	GPIO Port11	4	GPIO Port15
5	GPIO Port12	6	GPIO Port16
7	GPIO Port13	8	GPIO Port17
9	Ground	10	+5V

Additionally, 4-extra Digital Output ports inversely amplified signals from GPIO ports. There are open-drain buffers, which can offer greater driving capacity up to 100mA.

There are two PnP I/O port addresses that can be used to configure GPIO ports,

1) 0x2E - EFER (Extended Function Enable Register, for entering Extended Function Mode)
   - EFIR (Extended Function Index Register, for identifying CR index number)
2) 0x2F - EFDR (Extended Function Data Register, for accessing desired CR)

Below are some example codes, which demonstrate the use of GPIOs.

```
// Enter Extended Function Mode
outp(0x002E, 0x87);
outp(0x002E, 0x87);
// Assign Pin121-128 to be GPIO port 1
outp(0x002E, 0x29);
outp(0x002F,0x7F) ;
// Select Logic Device 7
outp(0x002E, 0x07);
outp(0x002F, 0x07);
// Active Logic Device 7
outp(0x002E, 0x30);
```

```
outp(0x002F, 0xFF);
// Select Inversion Mode
outp(0x002E, 0xF2);

outp(0x002F, (inp(0x002F) & 0x0F) | ( Inversion Register & 0xF0));
// Select I/O Mode
outp(0x002E, 0xF0);
outp(0x002F, (inp(0x002F) & 0x0F) | ( I/O Selection Register & 0xF0));
// Access GPIO ports
outp(0x002E, 0xF1);
outp(0x002F, (inp(0x002F) & 0x0F) | ( Output Data & 0xF0));
or
Input Data = inp(0x002F);
// Exit Extended Function Mode
outp(0x002E, 0xAA);
```

Definitions of Variables:

Each bit in the lower nibble of each Register represents the setting of a GPIO port.
Bit0 vs. GPIO port 1
Bit1 vs. GPIO port 2
Bit2 vs. GPIO port 3
Bit3 vs. GPIO port 4
Bit4 vs. GPIO port 5
Bit5 vs. GPIO port 6
Bit6 vs. GPIO port 7
Bit7 vs. GPIO port 8

Value of Inversion Register:
Only high nibble is available for this function.
When set to a '1', the incoming/outgoing port value is inverted.
When set to a '0', the incoming/outgoing port value is the same as in Data Register.

Value of I/O Selection Register:
Only high nibble is available for this function.
When set to a '1', respective GPIO port is programmed as an input port.
When set to a '0', respective GPIO port is programmed as an output port.

Value of Output Data / Input Data:
Only high nibble is available for this function.
If a port is assigned to be an output port, then its respective bit can be read/written.
If a port is assigned to be an input port, then its respective bit can be read only.

Notes:

1) All the Buffered Digital Outputs are open-drain amplified form corresponding GPIO ports.
3) Some other functions may occupy the lower nibble of the registers. Altering any content in lower nibble will be undesired.

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Chapter 4
BIOS Setup Information

The 96M4301o is equipped with the Phoenix (AWARD) BIOS stored in Flash ROM. These BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When system is turned on, 96M4301o communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start-up.

4.1 Entering Setup

Turn on or reboot the computer. When the message "Hit <DEL> if you want to run SETUP" appears, press <Del> key immediately to enter BIOS setup program.

If the message disappears before you respond, but you still wish to enter Setup, please restart the system to try "COLD START" again by turning it OFF and then ON, or touch the "RESET" button. You may also restart from "WARM START" by pressing <Ctrl>, <Alt>, and <Delete> keys simultaneously. If you do not press the keys at the right time and the system will not boot, an error message will be displayed and you will again be asked to,

Press <F1> to Run SETUP or Resume

In HIFLEX BIOS setup, you can use the keyboard to choose among options or modify the system parameters to match the options with your system. The table below will show you all of keystroke functions in BIOS setup.

General Help	
↑ ↓ → ←	: Move
Enter	: Select
+ / - /PU /PD	: Value
ESC	: Exit
F1	: General Help
F2	: Item Help
F5	: Previous Values
F6	: Fail-Safe Defaults
F7	: Optimized Defaults
F9	: Menu in BIOS
F10	: Save

4.2 Main Menu

Once you enter 96M4301o AWARD BIOS CMOS Setup Utility, you should start with the Main Menu. The Main Menu allows you to select from eleven setup functions and two exit choices. Use arrow keys to switch among items and press <Enter> key to accept or bring up the sub-menu.

Phoenix- AwardBIOS CMOS Setup Utility

▶ Standard CMOS Features ▶ Advanced BIOS Features ▶ Advanced Chipset Features ▶ Integrated Peripherals ▶ Power Management Setup ▶ PnP/PCI Configurations ▶ PC Health Status	▶ Frequency/Voltage Control Load Fail-Safe Defaults Load Optimized Defaults Set Supervisor Password Set User Password Save & Exit Setup Exit Without Saving
ESC : Quit F9 : Menu in BIOS F10 : Save & Exit Setup	↑ ↓ → ← : Select Item
Time, Date, Hard Disk Type …	

Note:
It is strongly recommended to reload Optimal Setting if CMOS is lost or BIOS is updated.

4.3 Standard CMOS Setup Menu

This setup page includes all the items in standard compatible BIOS. Use the arrow keys to highlight the item and then use the <PgUp>/<PgDn> or <+>/<-> keys to select the value or number you want in each item and press <Enter> key to certify it.

Follow command keys in CMOS Setup table to change **Date**, **Time**, **Drive type**, and **Boot Sector Virus Protection Status**.

■ **Screen shot**

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features

Date: (mm:dd:yy)	Mon, Mar 13 2006	Item Help
Time: (hh,mm,ss)	13:51:13	
▶ IDE Channel 0 Master	[Maxtor 91021U2]	Menu Level ▶
▶ IDE Channel 0 Slave	[CD-540E]	
▶ IDE Channel 1 Master	[None]	Change the day, month, year and century
▶ IDE Channel 1 Slave	[None]	
▶ IDE Channel 2 Master	[ST3120827AS]	
▶ IDE Channel 2 Slave	[None]	
▶ IDE Channel 3 Master	[None]	
▶ IDE Channel 3 Slave	[None]	
Drive A	[1.44M, 3.5 in.]	
Drive B	[None]	
Video	[EVG/VGA]	
Base Memory	640K	
Extended Memory	1039360K	
Total Memory	1040384K	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Note:
Setting On-Chip Serial ATA is Enhanced Mode.

■ **Menu Selections**

Item	Options	Description
Date	mm:dd:yy	Change the day, month, year and century
Time	hh:mm:ss	Change the internal clock
IDE Channel 0 /1 Master	Options are in its sub menu	Press <Enter> to enter the sub menu of detailed options
IDE Channel 0 /1 Slave	Options are in its sub menu	Press <Enter> to enter the next page for detail hard drive settings
Drive A Drive B	None 360K, 5.25 in 1.2M, 5.25 in 720K, 3.5 in 1.44M, 3.5 in 2.88M, 3.5 in	Press <Enter> to enter the next page for detail hard drive settings
Video	EGA/VGA CGA 40, CGA 80, MONO	Select the default video device
Base Memory	640K	Displays the amount of conventional memory detected during boot up
Extended Memory	N/A	Displays the amount of extended memory detected during boot up
Total Memory	N/A	Displays the total memory available in the system

4.4 IDE Adaptors Setup Menu

The IDE adapters control the IDE devices, such as Hard disk drive or CDROM drive. It uses a separate sub menu to configure each hard disk drive.

Phoenix- AwardBIOS CMOS Setup Utility
IDE Channel 0 Master

IDE HDD Auto-Detection	[Press Enter]	Item Help
IDE Channel 0 Master	[Auto]	
Access Mode	[Auto]	Menu Level ►
Capacity	10246 MB	To auto-detect the HDD's size, head … on this channel
Cylinder	19852	
Head	16	
Precomp	0	
Landing Zone	19851	
Sector	63	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

■ **Menu Selections**

Item	Options	Description
IDE HDD Auto-detection	Press Enter	Press Enter to auto-detect the HDD on this channel. If detection is successful, it fills the remaining fields on this menu.
IDE Channel 0 Master	None Auto Manual	Selecting 'manual' lets you set the remaining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc. Note: PRECOMP=65535 means NONE!
Access Mode	CHS LBA Large Auto	Choose the access mode for this hard disk
Capacity	Auto Display your disk drive size	Disk drive capacity (Approximated). Note that this size is usually slightly greater than the size of a formatted disk given by a disk-checking program.
The following options are selectable only if the 'IDE Channel 0 Master' item is set to 'Manual'		
Cylinder	Min = 0 Max = 65535	Set the number of cylinders for this hard disk.
Head	Min = 0 Max = 255	Set the number of read/write heads
Precomp	Min = 0 Max = 65535	**** Warning: Setting a value of 65535 means no hard disk
Landing zone	Min = 0 Max = 65535	****
Sector	Min = 0 Max = 255	Number of sectors per track

Phoenix- AwardBIOS CMOS Setup Utility
IDE Channel 2 Master

IDE HDD Auto-Detection	[Press Enter]	Item Help
IDE Channel 2 Master	[Auto]	Menu Level ▶
Access Mode	[Auto]	To atuo-detect the HDD's size, head … on this channel
Capacity	120GB	
Cylinder	57461	
Head	16	
Precomp	0	
Landing Zone	57460	
Sector	255	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

■ **Menu Selections**

Item	Options	Description
IDE HDD Auto-detection	Press Enter	Press Enter to auto-detect the HDD on this channel. If detection is successful, it fills the remaining fields on this menu.
IDE Channel 2 Master	None Auto	Selecting 'manual' lets you set the remaining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc. Note: PRECOMP=65535 means NONE!
Access Mode	Large Auto	Choose the access mode for this hard disk
Capacity	Auto Display your disk drive size	Disk drive capacity (Approximated). Note that this size is usually slightly greater than the size of a formatted disk given by a disk-checking program.
The following options are selectable only if the 'IDE Channel 2 Slave' item is set to 'Manual'		
Cylinder	Min = 0 Max = 65535	Set the number of cylinders for this hard disk
Head	Min = 0 Max = 255	Set the number of read/write heads
Precomp	Min = 0 Max = 65535	**** Warning: Setting a value of 65535 means no hard disk
Landing zone	Min = 0 Max = 65535	****
Sector	Min = 0 Max = 255	Number of sectors per track

4.5 Advanced BIOS Features

This section allows you to configure your system for basic operation. You have the opportunity to select the system's default speed, boot-up sequence, keyboard operation, shadowing and security.

■ **Screen shot**

Phoenix – AwardBIOS CMOS Setup Utility
Advanced BIOS Features

▶ CPU Feature	[Press Enter]	Item Help
▶ Hard Disk Boot Priority	[Press Enter]	
Virus Warning	[Disabled]	Menu Level ➢
CPU L1 & L2 Cache	[Enabled]	
Quick Power On Self Test	[Enabled]	
First Boot Device	[Floppy]	
Second Boot Device	[Hard Disk]	
Third Boot Device	[LS120]	
Boot Other Device	[Enabled]	
Swap Floppy Drive	[Disabled]	
Boot up Floppy Seek	[Enabled]	
Boot up NumLock Status	[On]	
Gate A20 Option	[Fast]	
Typematic Rate Setting	[Disabled]	
X Typematic Rate (Chars/Sec)	6	
X Typematic Delay (Msec)	250	
Security Option	[Setup]	
X APIC Mode	Enabled	
MPS Version Control For OS	[1.4]	
Small Logo(EPA) Show	[Disabled]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Phoenix- AwardBIOS CMOS Setup Utility
CPU Feature

Delay Prior to Thermal	[16 Min]	Item Help
Thermal Management	Thermal Monitor 1	
Limit CPUID MaxVal	[Disabled]	Menu Level ▶

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Delay Prior to Thermal

The choice: 4 Min, 8 Min, 16 Min, and 32 Min.

Limit CPUID Maxval

Set Limit CPUID MaxVal to 3, Should Be "Disabled" for WinXP.

Enabled	For OS: Windows NT4.0 Install.
Disabled	For OS: Windows XP Install.

Phoenix- AwardBIOS CMOS Setup Utility
Hard Disk Boot Priority

1. ch0 M. : Maxtor 91021U2 2. ch2 M. : ST3120827AS 3. Bootable add-in Cards	Item Help Menu Level ▶ Use < ↑ > or < ↓ > to select a device, then press <+> to move it up, or <-> to move it down the list. Press <ESC> to exit this menu.
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults	

Hard Disk Boot Priority

Select Hard Disk Boot Device Priority. Use < ↑ > or < ↓ > to select a device, then press <+> to move it up, or <-> to move it down the list. Press <ESC> to exit this menu.

Bootable Add-in Cards	Select SCSI card, RAID card, ATA card Boot

Virus Warning

Allow you to choose the VIRUS warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempt to write data into this area, BIOS will show a warning message on screen and alarm beep.

Enabled	Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.
Disabled	No warning message will appear when anything attempts to access the boot sector or hard disk partition table.

CPU L1 Cache / L2 Cache

These two categories speed up memory access. However, it depends on CPU/chipset design.

Enabled	Enable Cache
Disabled	Disable Cache

Quick Power On Self Test

Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.

Enabled	Enable quick POST
Disabled	Normal POST

First/Second/Third Boot Device

Select your boot device priority.

The choice: Floppy, LS120, Hard Disk, CDROM, ZIP100, USB-FDD, USB-ZIP, USB-CDROM, and Disabled.

Boot Other Device

Select your boot device priority.

The choice: Enabled, Disabled.

Swap Floppy Drive

If the system has two floppy drives, choose enable to assign physical driver B to logical drive A and Vice-Versa.

The choice: Enabled, Disabled.

Boot Up Floppy Seek

Enabled tests floppy drives to determine whether they have 40 or 80 tracks.

The choice: Enabled, Disabled.

Boot Up NumLock Status

Select power on state for NumLock.

The choice: Off, On.

Gate A20 Option

Fast-lets chipsets control Gate A20 and Normal – a pin in the keyboard controller controls Gate A20. Default is Fast.

The choice: Normal, Fast.

Typematic Rate Setting

Keystrokes repeat at a rate determined by the keyboard controller – When enabled, the typematic rate and typematic delay can be selected.

The choice: Enabled, Disabled.

Typematic Rate (Chars/sec)

The rate at which character repeats when you hold down a key.

The choice: 6, 8, 10, 12, 15, 20, 24, and 30.

Typematic delay (Msec)

The delay before keystrokes begin to repeat.

The choice: 250, 500, 750, and 1000.

Security Option

Select whether the password is required every time the system boots or only when you enter setup.

System	The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

APIC Mode

Setting to Enabled can cause instabilities. Once the operating system is installed, such as Windows XP in my case, this setting cannot be changed without reinstalling the operating system, regardless of whether the initial setting is Disabled or Enabled. The purpose of setting it to Enabled is to extend the number of IRQ's, which sounds like a real risky proposition. I'm not surprised to see the conclusion reached at APIC: Benefit or Trouble. The number of IRQ's should be fine without being extended, anyway.

The choice: Enabled, Disabled.

MPS Version Control For OS

Not changeable with APIC Mode set to disabled.

The choice: 1.1, 1.4.

Small Logo (EPA) Show

The choice: Enabled, Disabled.

4.6 Advanced Chipset Features

This section allows you to configure the system based on the specific features of the Intel 915GM chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM (DDR II DIMM) and the external cache. It also coordinates communications between the conventional PCI Express bus and PCI bus. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system.

Phoenix- AwardBIOS CMOS Setup Utility
Advanced Chipset Features

DRAM Timing Selectable	[By SPD]	Item Help
X CAS Latency Time	4	
X DRAM RAS# to CAS# Delay	4	Menu Level ▶
X DRAM RAS# Precharge	4	
X Precharge delay (tRAS)	12	
X System Memory Frequency	533MHz	
SLP_S4# Assertion Width	[4 to 5 Sec.]	
System BIOS Cacheable	[Enabled]	
Video BIOS Cacheable	[Disabled]	
Memory Hole At 15M-16M	[Disabled]	
▶ PCI Express Root Port Func	[Press Enter]	
** VGA Setting **		
PEG/Onchip VGA Control	[Auto]	
On-Chip Frame Buffer Size	[8MB]	
DVMT Mode	[DVMT]	
DVMT /FIXED Memory Size	[128MB]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

DRAM Timing Selectable

This option provides DIMM plug-and-play support by serial presence detect (SPD) mechanism via the system management bus (SMBUS) interface.

The choice: Manual, By SPD.

CAS Latency Time

This option controls the number of SCLKs between the time a read command is sampled by the DRAMs and the time the GMCH samples correspondent data from the DRAMs.

The choice: 5 4, 3, and Auto.

DRAM RAS# to CAS# Delay

This option controls the number of SCLKs (SDRAM Clock) from a row activate command to a read or write command. If your system installs good quality of SDRAM, you can set this option to "3 SCLKs" to obtain better memory performance. Normally, the option will be set to Auto.

The choice: 2, 3, 4, 5 and Auto.

DRAM RAS# Precharge

This option controls the number of SCLKs for RAS# precharge. If your system installs good quality of SDRAM, you can set this option to "3 SCLKs" to obtain better memory performance. It is set to auto normally.

The choice: 2, 3, 4, 5 and Auto.

Precharge delay (tRAS)

The choice: 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and Auto.

System Memory Frequency

Users are recommended to use Auto for memory frequency selection.

The choice: 333MHz, 400MHz, 533MHz, and Auto.

SLP_S4# Assertion Width

The choice: 4 to 5 Sec., 3to 4 Sec, 2 to 3 Sec., 1 to 2 Sec.

System BIOS Cacheable

Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

The choice: Enabled, Disabled.

Video BIOS Cacheable

Select "Enabled" to enable caching VGA BIOS into L2 cache to get higher display performance. "Disabled" to ignore this BIOS caching function.

The choice: Enabled, Disabled.

Phoenix- AwardBIOS CMOS Setup Utility
PCI Express Root Port Func

PCI Express Port 1	[Auto]	Item Help
PCI Express Port 2	[Auto]	
PCI Express Port 3	[Auto]	Menu Level ▶
PCI Express Port 4	[Auto]	
PCI-E Compliancy Mode	[V1.0a]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

PCI Express Port 1 / Port 2 / Port 3 / Port 4

The choice: Auto, Enabled, Disabled.

PCI-E Compliancy Mode

The choice: V1.0 / V1.0a.

PEG/Onchip VGA Control

The choice: Onchip VGA, PEG Port, and Auto.

On-Chip Frame Buffer Size

The choice: 1MB, 8MB.

DVMT Mode

The choice: FIXED, DVMT and BOTH.

DVMT /FIXED Memory Size

The choice: 64MB, 128MB.

4.7 Integrated Peripherals

Phoenix- AwardBIOS CMOS Setup Utility
Integrated Peripherals

▶ OnChip IDE Device	[Press Enter]	Item Help
▶ Onboard Device	[Press Enter]	
▶ Super IO Device	[Press Enter]	Menu Level ▶
Watch Dog Timer Select	[Disabled]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Phoenix- AwardBIOS CMOS Setup Utility
OnChip IDE Device

IDE HDD Block Mode	[Enabled]	Item Help
IDE DMA transfer access	[Enabled]	
On-Chip Primary PCI IDE	[Enabled]	Menu Level ▶
IDE Primary Master PIO	[Auto]	
IDE Primary Slave PIO	[Auto]	If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support
IDE Primary Master UDMA	[Auto]	
IDE Primary Slave UDMA	[Auto]	
On-Chip Secondary PCI IDE	[Enabled]	
IDE Secondary Master PIO	[Auto]	
IDE Secondary Slave PIO	[Auto]	
IDE Secondary Master UDMA	[Auto]	
IDE Secondary Slave UDMA	[Auto]	
*** On-Chip Serial ATA Setting ***		
On-Chip Serial ATA	[Enhanced Mode]	
X PATA IDE Mode	Primary	
SATA Port	P1, P3 is Secondary	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

IDE HDD Block Mode

If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

The choice: Enabled, Disabled.

IDE DMA transfer access

The choice: Enabled, Disabled.

On-Chip Primary/Secondary PCI IDE

The chipset contains a PCI IDE interface with support for two IDE channels. Select Enabled to activate the primary IDE interface. Select Disabled to deactivate this interface.

The choice: Enabled, Disabled.

IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

The choice: Auto, Mode 0, Mode 1, Mode 2, Mode 3, and Mode 4.

IDE Primary/Secondary Master/Slave UDMA

Ultra DMA/33/66/100 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If you're hard drive and your system software both support Ultra DMA/33/66/100, select Auto to enable BIOS support.

The choice: Auto, Disabled.

On-Chip Serial ATA

Disabled	Disabled SATA Controller.
Auto	Auto arrange by BIOS.
Combined Mode	PATA and SATA are combined. Max. Of 2 IDE drives in each channel.
Enhanced Mode	Enable both SATA and PATA. Max. Of 6 IDE drives are Supported.
SATA Only	SATA is operating in legacy mode.

Phoenix- AwardBIOS CMOS Setup Utility
Onboard Device

USB Controller	[Enabled]	Item Help
USB 2.0 Controller	[Enabled]	
USB Keyboard Support	[Enabled]	Menu Level ▶
USB Mouse Support	[Disabled]	
AC97 Audio Select	[Auto]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

USB Controller

This item allows you to enable/disable USB (Universal Serial Bus) function.

The choice: Enabled, Disabled.

USB 2.0 Controller

This entry is for disable/enable EHCI controller only. This BIOS itself may/may not have high speed USB support built in, the support will be automatically turn on when high speed device were attached.

The choice: Enabled, Disabled.

USB Keyboard Support

This item allows you to enable USB keyboard function under POST, BIOS setup menu, DOS, or Windows-NT with no USB driver loaded.

The choice: Enabled, Disabled.

USB Mouse Support

This item allows you to enabled USB Mouse function under POST, BIOS Setup menu, DOS, or Window-NT with no USB driver loaded.

The choice: Enabled, Disabled.

AC97 Audio Select

Users can disable on board AC97 Audio function.

The choice: Auto, Disabled.

Phoenix- AwardBIOS CMOS Setup Utility
Super IO Device

POWER ON Function	[BUTTON ONLY]	Item Help
X KB Power ON Password	Enter	
X Hot Key Power ON	Ctrl-F1	Menu Level ▶
Onboard FDC Controller	[Enabled]	
Onboard Serial Port 1	[3F8/IRQ4]	
Onboard Serial Port 2	[2F8/IRQ3]	
UART Mode Select	[Normal]	
X RxD, TxD Active	Hi, Lo	
X IR Transmission Delay	Enabled	
X UR2 Duplex Mode	Half	
X Use IR Pins	IR-Rx2Tx2	
Onboard Parallel Port	[378/IRQ7]	
Parallel Port Mode	[SPP]	
X EPP Mode Select	EPP1.7	
X ECP Mode Use DMA	3	
PWRON After PWR-Fail	[Off]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Power On Function

This item allows you to select different power on scheme using ATX power supply.

Password	Power on using customized password string
Hot Key	Power on using special customized key
Mouse Left	Power on using mouse left click
Mouse Right	Power on using mouse right click
Any Key	Power on using any keyboard key
Button Only	Power on by power Button
Keyboard 98	Power on by keyboard 98 [Only power ON/OFF key]

Onboard FDC Controller

This item allows you to enable/disable onboard Floppy disk controller.

The choice: Enabled, Disabled.

Onboard Serial Port 1/Port 2

Select an address and corresponding interrupt for the first and second serial ports.

The choice: 3F8/IRQ4, 2F8/IRQ3, 3E8/IRQ4, 2E8/IRQ3, Disabled, Auto.

UART Mode Select

This item allows users to select Infrared transmission mode.

Normal	Disable Infrared function
IrDA	Select IrDA mode transmission
ASKIR	Select ASKIR mode transmission

As Infrared transmission function shares onboard serial port 2, COM2 needs to be enabled.

RxD, TxD Active

This item is to configure Infrared transmission rate. Four options are available:

Hi, Hi	High rate for receiving / High rate for transmitting
Hi, Lo	High rate for receiving / Low rate for transmitting
Lo, Hi	Low rate for receiving / High rate for transmitting
Lo, Lo	Low rate for receiving / Low rate for transmitting

IR Transmission Delay

This option will be available when IR is enabled.

The choice: Enabled, Disabled.

UR2 Duplex Mode

The available choices are full duplex mode and half duplex mode

The choice: Full, Half.

Use IR Pins

The available choices are IR-Rx2Tx2/ RxD2, TxD2.

The choice: IR-Rx2Tx2 / RxD2, TxD2.

Onboard Parallel Port

This item allows you to configure I/O address of the onboard parallel port.

The choice: Disabled, 378/IRQ7, 278/IRQ5, and 3BC/IRQ7.

Parallel Port Mode

There are four different modes for the onboard parallel port:

SPP	Switch to SPP mode
EPP	Switch to EPP mode
ECP	Switch to ECP mode
ECP + EPP	Switch to ECP + EPP mode
Normal	Switch to Normal mode

EPP Mode Select

Select different version of EPP mode.

The choice: EPP1.7, EPP1.9.

ECP Mode Use DMA

Select a proper DMA channel for ECP mode.

The choice: 1, 3.

PWRON After PWR-Fail

This item allows user to configure the power status of using ATX power supply after a serious power loss occurs.

On	System automatically restores power back
Off	System stays at power –off

Watch Dog Timer Select

This BIOS testing option is able to reset the system according to the selected table.

The choice: Disabled, 10 Sec, 20 Sec, 30 Sec, 40 Sec, 1 Min, 2 Min, and 4 Min.

4.8 Power Management Setup

The Power Management Setup allows you to configure you system to most effectively save energy while operating in a manner consistent with your own style of computer use.

Phoenix- AwardBIOS CMOS Setup Utility
Power Management Setup

ACPI Function	[Enabled]	Item Help
ACPI Suspend Type	[S1(POS)]	
X Run VGABIOS if S3 Resume	Auto	Menu Level ▶
Power Management	[User Define]	
Video Off Method	[DPMS]	
Video Off In Suspend	[Yes]	
Suspend Type	[Stop Grant]	
Suspend Mode	[Disabled]	
HDD Power Down	[Disabled]	
Soft-Off by PWR-BTTN	[Instant-Off]	
Wake-up by On Board LAN	[Enabled]	
Power On by Ring	[Enabled]	
X USB KB Wake-Up From S3	Disabled	
Resume by Alarm	[Disabled]	
X Date(of Month) Alarm	0	
X Time(hh:mm:ss) Alarm	0 : 0 :0	
** Reload Global Timer Events **		
Primary IDE 0	[Disabled]	
Primary IDE 1	[Disabled]	
Secondary IDE 0	[Disabled]	
Secondary IDE 1	[Disabled]	
FDD,COM,LPT Port	[Disabled]	
PCI PIRQ[A-D]#	[Disabled]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

ACPI Function

This item allows you to enable/disable the Advanced Configuration and Power Management (ACPI).

The choice: Enabled, Disabled.

ACPI Suspend Type

To decide which ACPI suspend mode to use.

The choice: S1(POS), S3(STR).

Run VGA BIOS if S3 Resume

The choice: Auto, Yes, No.

Power Management

This category allows you to select the type (or degree) of power saving and is directly related to "HDD Power Down", "Suspend Mode".

There are three selections for Power Management, three of which have fixed mode settings.

Min. Power Saving	Minimum power management. Suspend Mode = 1 Hour, and HDD Power Down = 15 Min.
Max. Power Saving	Maximum power management. Suspend Mode = 1 Min., and HDD Power Down = 1 Min.
User Defined	Allow you to set each mode individually. When not disabled, Suspend Mode ranges from 1 min. to 1 Hour and HDD Power Down ranges from 1 Min. to 15 Min.

Video Off Method

This determines the manner in which the monitor is blanked.

V/H SYNC+Blank	This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer.
DPMS	Initial display power management signaling.

Video Off In Suspend

This allows user to enable/disable video off in Suspend Mode.

The choice: Yes, No.

Suspend Type

Two options are available: Stop Grant and PwrOn Suspend.

The choice: Stop Grant, PwrOn Suspend.

Suspend Mode

When enabled and after the set time of system inactivity, all devices except the CPU will be shut off.

The choice: Disabled, 1 Min, 2 Min, 4 Min, 8 Min, 12 Min, 20 Min, 30 Min, 40 Min, and 1 Hour.

HDD Power Down

When enabled and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

The choice: Disabled, 1 Min, 2 Min, 3 Min, 4 Min, 5 Min, 6 Min, 7 Min, 8 Min, 9 Min, 10 Min, 11 Min, 12 Min, 13 Min, 14 Min, and 15 Min.

Soft-Off by PWR-BTTN

This item allows users to set the time to remove the power after the power button is pressed.

The choice: Instant-Off, Delay 4 Sec.

Wake-Up by On Board LAN

This option can be enabled to support Wake Up by on-board LAN.

The choice: Disabled, Enabled.

Power On by Ring

When select "Enabled", a system that is at soft-off mode will be alert to Wake-On-Modem signal.

The choice: Enabled, Disabled.

USB KB Wake-up From S3

The choice: Enabled, Disabled.

Resume by Alarm

This item allows users to enable/disable the resume by alarm function. When "Enabled" is selected, system using ATX power supply could be powered on if a customized time and day is approached.

The choice: Enabled, Disabled.

Date(of Month) Alarm

When "Resume by Alarm" is enabled, this item could allow users to configure the date parameter of the timing dateline on which to power on the system.

The choice: 0 ~ 31.

Time(hh:mm:ss) Alarm

When "Resume by Alarm" is enabled, this item could allow users to configure the time parameter of the timing dateline on which to power on the system.

The choice: hh (0~23), mm (0~59), ss (0 ~59).

Primary/Secondary IDE 0/1

This item is to configure IDE devices being monitored by system so as to keep system out of suspend mode if the associated device is busy.

The choice: Enabled, Disabled.

FDD, COM, LPT Port

This item is to configure floppy device, COM ports, and parallel port being monitored by system so as to keep system out of suspend mode if the associated device is busy.

The choice: Enabled, Disabled.

PCI PIRQ[A-D]#

This option can be used to detect PCI device activities. If they are activities, the system will go into sleep mode.

The choice: Enabled, Disabled.

4.9 PnP/PCI Configurations

This section describes configuring the PCI bus system. PCI, or **P**ersonal **C**omputer **I**nterconnect, is a system, which allows I/O devices to operate at speeds nearing the speed the CPU itself, uses when communicating with its own special components.

This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

Phoenix- AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

Init Display First	[PCI Slot]	Item Help
Reset Configuration Data	[Disabled]	
		Menu Level ▶
Resources Controlled By	[Auto(ESCD)]	
X IRQ Resources	Press Enter	
PCI/VGA Palette Snoop	[Disabled]	
INT Pin 1 Assignment	[Auto]	
INT Pin 2 Assignment	[Auto]	
INT Pin 3 Assignment	[Auto]	
INT Pin 4 Assignment	[Auto]	
INT Pin 5 Assignment	[Auto]	
INT Pin 6 Assignment	[Auto]	
INT Pin 7 Assignment	[Auto]	
INT Pin 8 Assignment	[Auto]	
** PCI Express relative items **		
Maximum Payload Size	[128]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Init Display First

This item allows you to select the first display port to be initialized.

The choice: PCI Slot, Onboard.

Reset Configuration Data

Default is disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot.

The choice: Enabled, Disabled.

Resource Controlled By

BIOS can automatically configure the entire boot and plug and play compatible devices. If you choose Auto, you cannot select IRQ DMA and memory base address fields, since BIOS automatically assigns them.

The choice: Auto (ESCD), Manual.

IRQ Resources

When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the interrupt.

Enter for more options
IRQ-3/IRQ-4/IRQ-5/IRQ-7/IRQ-9/IRQ-10/IRQ-11/IRQ-12/IRQ-14/IRQ-15 assigned to.

Legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PnP for devices compliant with the plug and play standard whether designed for PCI or ISA bus architecture.

The choice: PCI Device / Reserved.

PCI/VGA Palette Snoop

The choice: Enabled, Disabled.

INT Pin 1 Assignment

Devices (S) using this INT: Display Cntrlr – Bus 0 Dev 2 Func 0. USB 1.0/1.1 UHCI Cntrlr – Bus 0 Dev29 Func 3.

The choice: Auto, 3, 4, 5, 7, 9, 10, 11, 12, 14, 15.

INT Pin 2 Assignment

Devices (S) using this INT: Multimedia Device – Bus 0 Dev 30 Func 2.

The choice: Auto, 3, 4, 5, 7, 9, 10, 11, 12, 14, 15.

INT Pin 3 Assignment

Devices (S) using this INT: Network Cntrlr – Bus 1 Dev 11 Func 0. USB 1.0/1.1 UHCI Cntrlr – Bus 0 Dev 29 Func 2.

The choice: Auto, 3, 4, 5, 7, 9, 10, 11, 12, 14, 15.

INT Pin 4 Assignment

Devices (S) using this INT: IDE Cntrlr – Bus 0 Dev 31 Func 2. Network Cntrlr – Bus 1 Dev 10 Func 0. USB 1.0/1.1 UHCI Cntrlr – Bus 0 Dev 29 Func 1. SMBus Cntrlr – Bus 0 Dev 31 Func 3.

The choice: Auto, 3, 4, 5, 7, 9, 10, 11, 12, 14, 15.

INT Pin 5 Assignment

Devices (S) using this INT: Simple COMM. Cntrlr – Bus 0 Dev 30 Func 3.

The choice: Auto, 3, 4, 5, 7, 9, 10, 11, 12, 14, 15.

INT Pin 6 Assignment/ INT Pin 7 Assignment

Device(s) using this INT.

The choice: Auto, 3, 4, 5, 7, 9, 10, 11, 12, 14, 15.

INT Pin 8 Assignment

Devices (S) using this INT: USB 1.0/1.1 UHCI Cntrlr – Bus 0 Dev 29 Func 0. USB 2.0 EHCI Cntrlr – Bus 0 Dev 29 Func 7.

The choice: Auto, 3, 4, 5, 7, 9, 10, 11, 12, 14, 15.

Maximum Payload Size

Set maximum TLP payload size for the PCI Express devices. The unit is byte.

The choice: 128, 256, 512, 1024, 2048, and 4096.

4.10 PC Health Status

Phoenix- AwardBIOS CMOS Setup Utility
PC Health Status

CPU Warning Temperature	[Disabled]	Item Help
Current System Temp	39℃/102℉	
Current CPU Temperature	40℃/104℉	Menu Level ▶
System Fan Speed	0 RPM	
CPU Fan Speed	2678 RPM	
Vcore	1.31 V	
+1.5V	1.44 V	
+3.3V	3.39 V	
+12V	11.85 V	
+5V	4.91 V	
VBAT (V)	3.07 V	
5VSB (V)	4.94 V	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

CPU Warning Temperature

This item allows you to set a temperature above which the system will start the beeping warning. Default setting is disabled. This function will only with "ACPI" power management and "S3 (STR)" suspends type.

The choices : Disabled, 50℃/122℉, 53℃/127℉, 56℃/133℉, 60℃/140℉, 63℃/145 ℉, 66℃/151℉, 70℃/158℉.

4.11 Frequency/Voltage Control

Phoenix – AwardBIOS CMOS Setup Utility
Frequency/Voltage Control

Auto Detect PCI CLK	[Enabled]	Item Help
Spread Spectrum	[Disabled]	
		Menu Level ▶

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Auto Detect PCI CLK

The choice: Enabled/Disabled.

Spread Spectrum

This item allows you to enable/disable the spread spectrum modulate.

The choice: Enabled/Disabled.

4.12 Default Menu

Selecting "Defaults" from the main menu shows you two options, which are described below

Load Fail-Safe Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Fail-Safe Defaults (Y/N) ? N

Pressing 'Y' loads the BIOS default values for the most stable, minimal-performance system operations.

Load Optimized Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Optimized Defaults (Y/N) ? N

Pressing 'Y' loads the default values that are factory settings for optimal performance system operations.

4.13 Supervisor/User Password Setting

You can set either supervisor or user password, or both of then. The differences between are:

Set Supervisor Password : can enter and change the options of the setup menus.

Set User Password : just can only enter but do not have the right to change the options of the setup menus. When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option (see Section 3). If the Security option is set to “System”, the password will be required both at boot and at entry to Setup. If set to “Setup”, prompting only occurs when trying to enter Setup.

4.14 Exiting Selection

Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing "Y" stores the selections made in the menus in CMOS – a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit Without Saving (Y/N)? N

This allows you to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

Chapter 5
Troubleshooting

This chapter provides you a few useful tips to quickly get your 96M4301o running with no failure. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

5.1 Quick installation Guide

Backplane

The 96M4301o is a full-sized SBC, and therefore is only able to run on PICMG 1.3 Backplane (PBPE-13A8 and PBPE-06V).For more detail support Backplane information , please contact with your system provider or hardware manufacture. The PCIE x 16 slots Only 96M4301o use (Figure 5-1, Figure 5-2)

PBPE-13A8

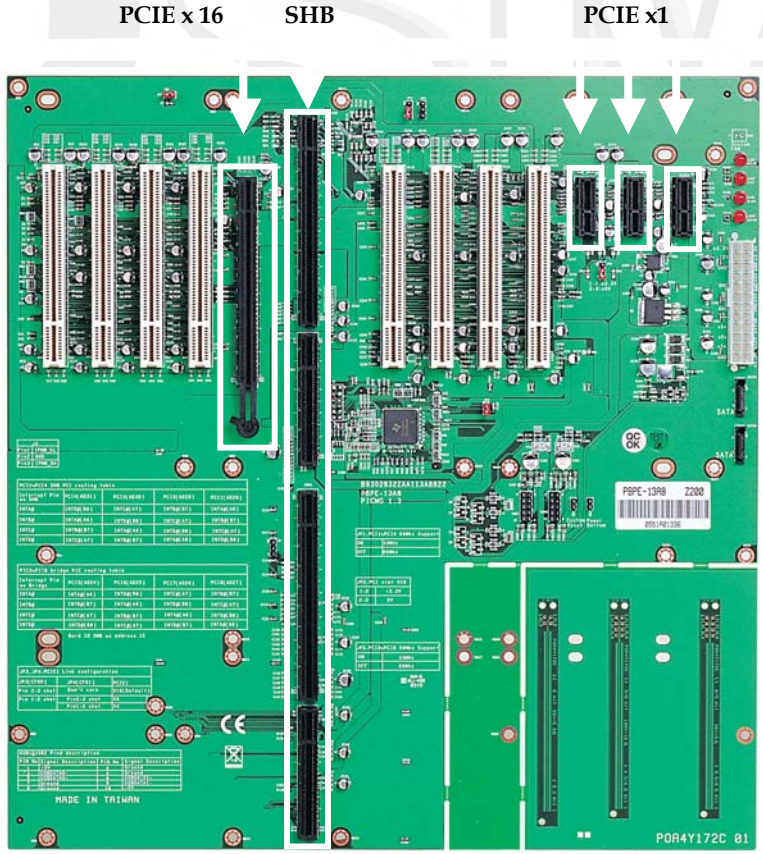
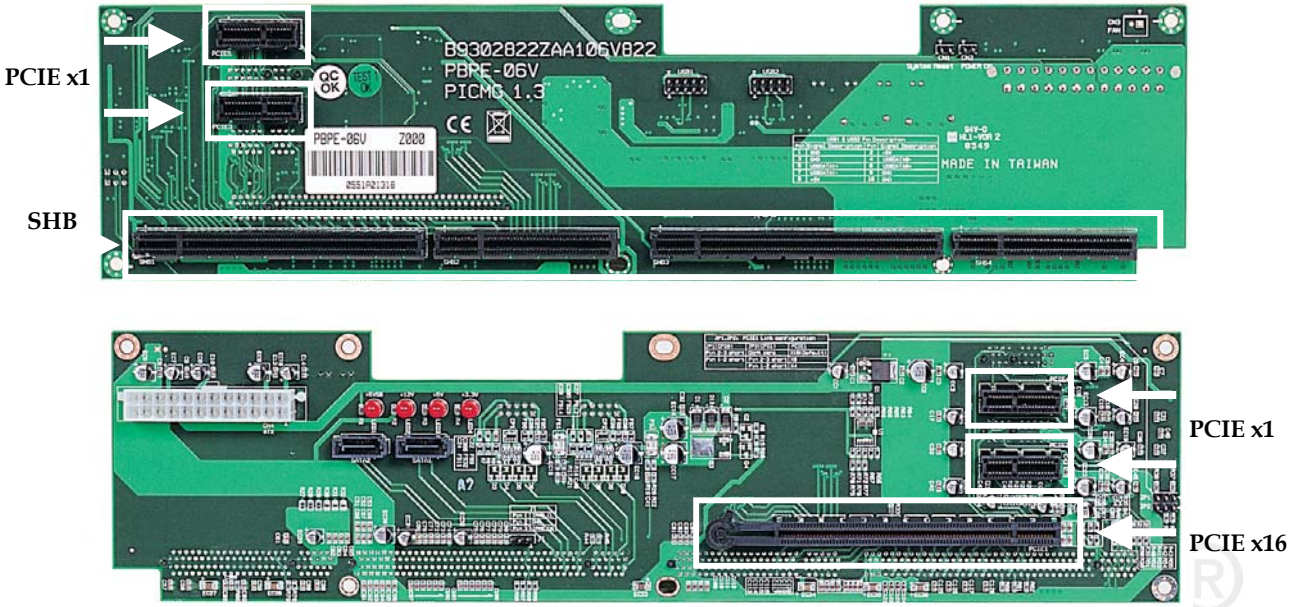


Figure 5-1

PBPE-13A8 supports eight PCI slots, one PCI Express x16 slot and three PCI Express x1 slot .

PBPE-06V



PBPE-06 supports one PCI Express x16 and four PCI Express x1

Figure 5-2

CPU Supplementary Power Connector

The 96M4301o requires power drawing from the 12V connector. The CPU supplementary power connector should be connected at all time for this P4 system to run properly. If the system's main power comes from a backplane, the CPU supplementary power connector should still be connected. (Figure 5-3)

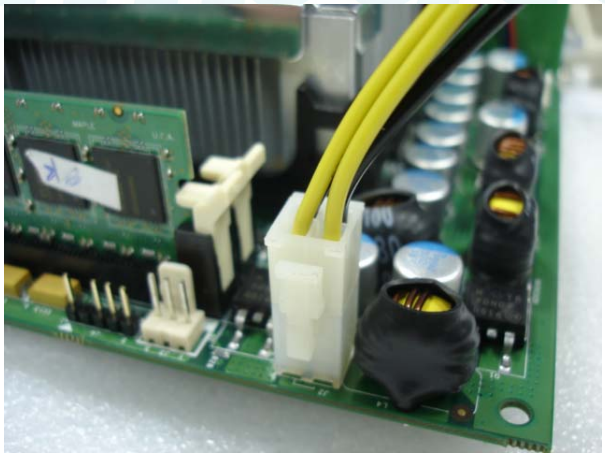
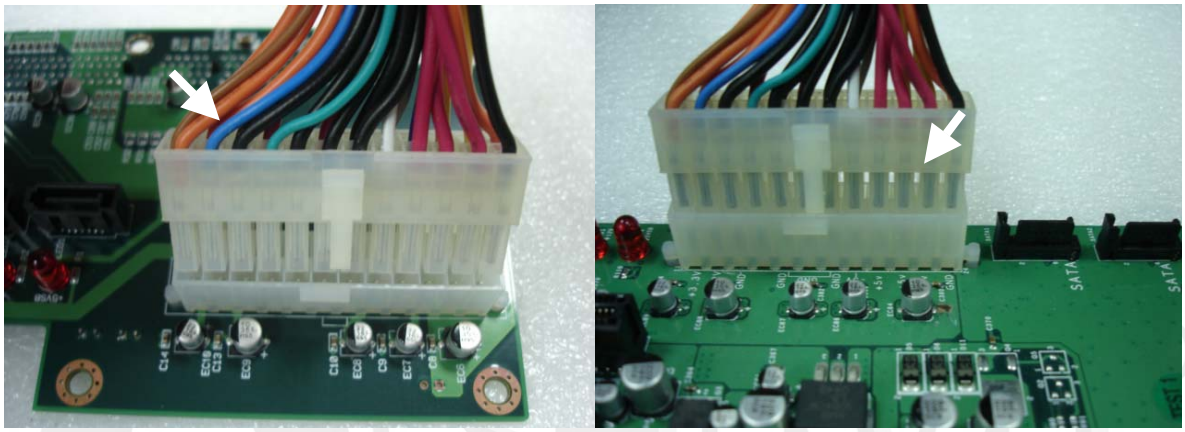


Figure 5-3

ATX Power Setting

This section would be more likely to introduce you how to set up ATX mode on your 96M4301o. Please refer to the following instruction.

Step1: Connect 24 -pin power cable of the ATX POWER with ATX POWER CONNECTOR (24 -pin) on the backplane (Figure 5-4)



PBPE-06V **PBPE-13A8**

Figure 5-4

Step2: The 96M4301o requires power drawing through golden finger via backplane and power connector (J2). The CPU supplementary Power Connector (J2) has to be connected to the system all the time. Otherwise, the system won't boot up properly.(Figure 5-5)

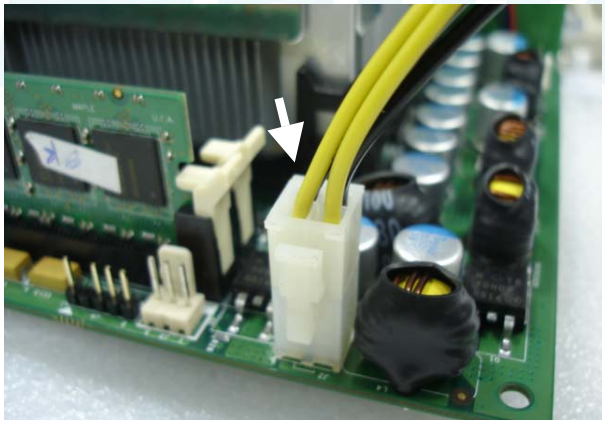


Figure 5-5

Step 3: Connect TOGGLE SWITCH (CN2) connector on PBPE-06V backplane (Figure 5-6) and PBPE-13A8 backplane (Figure 5-7), which is used to power on SBC. Generally, the TOGGLE SWITCH is located on the chassis of front panel.

Figure 5-6

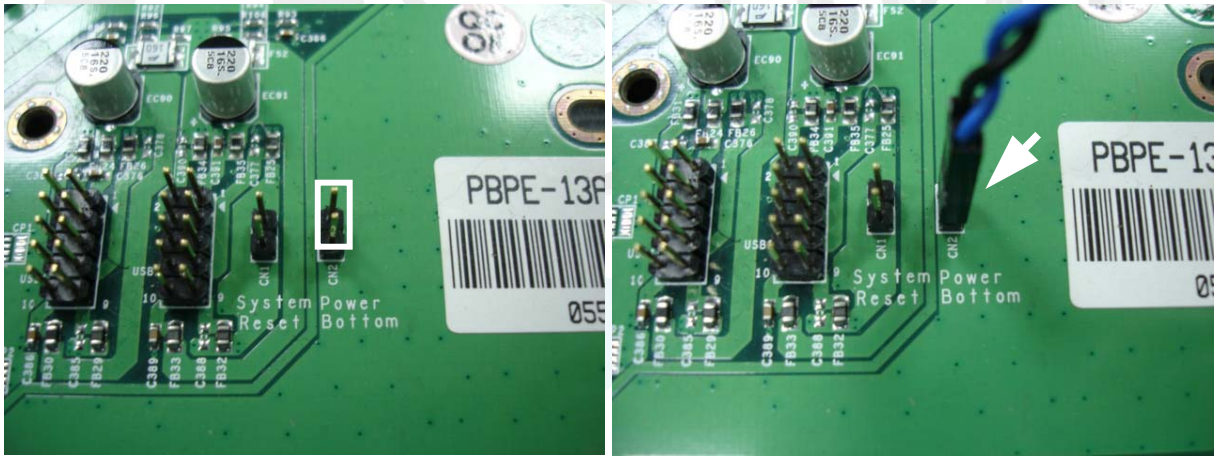


Figure 5-7

Step 6: The figure below is the TOGGLE SWITCH, which is used to switch the ATX Power on/off for SBC. Usually the TOGGLE SWITCH is located on the chassis front panel. Pressing the switch button once will turn power on, and press again to turn it off. (Figure 5-8)

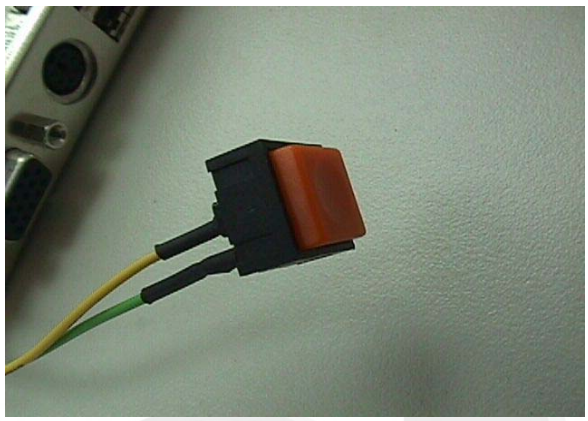


Figure 5-8

Unboot problem

Symptom : SBC keeps beeping, and no screen has shown.

Solution : In fact, each beep sound represents different definition of error message. Please refer to table as following:

Beep sounds	Meaning	Action
One long beep with one short beeps	DRAM error	Change DRAM or reinstall it
One long beep constantly	DRAM error	Change DRAM or reinstall it
One long beep with two short beeps	Monitor or Display Card error	Please check Monitor connector whether it inserts properly
Beep rapidly	Power error warning	Please check Power mode setting

Symptom : There is neither no beeps nor screen output.

Solution : Indeed, you might want to check the system with the stand-alone to identify the root cause by isolating the board from other possible system devices such as PCI device, Backplane, and so on. If the system still cannot boot up, please fill out RMA form which is provides on DSM website, and then send back to DSM AG as a RMA goods. Besides, you also visit RMA site (www.DSM.AG) to check RMA report if necessary.

5.2 Frequency Asking Questions

Q: What is Serial ATA and how to use it exactly?

A: The Intel ® ICH6 chipset contains four integrated Serial ATA host controllers capable of DMA operation on two ports. Unlike IDE bus, each Serial ATA channel can only connect to one SATA hard disk at a time; there are total four connectors, S_ATA1 to S_ATA4. The installation of Serial ATA is simpler and easier than IDE, because SATA hard disk doesn't require setting up Master and Slave, which can reduce mistake of hardware installation. All you need to do is to plug in two cables and enable SATA in System BIOS. (The Serial ATA hard disk of installation, please see figure 5-9 as below)

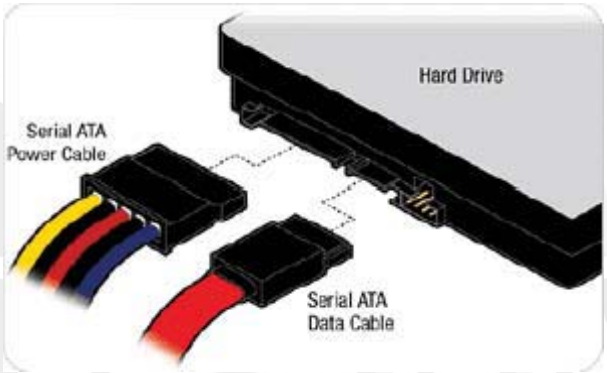
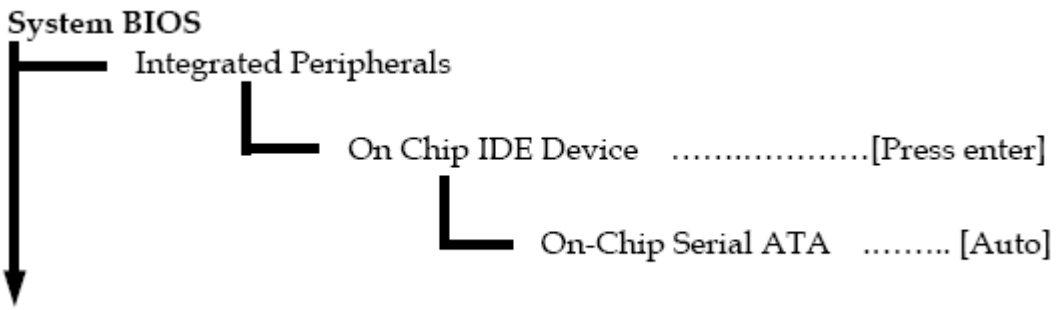


Figure 5-9

After done with the installation of SATA hardware, please enter system BIOS to enable Serial ATA function. Otherwise, Serial hardware won't be recognized. To enable SATA function, please see as following:



Q: Can I build Raid system on SATA bus with 96M4301o?

A: No, it cannot. It is because 96M4301o's south bridge is ICH6, which doesn't support RAID function.

Q: How can I build up an AT system using ATX power supply

A: Yes, 96M4301o can support system in AT mode.

Q: How to use Standard PS/2 Keyboard and Mouse?

A: Users may always adopt PS/2 keyboard and mouse over the J21 jumper interface (through bracket which supports PS/2 function) on 96M4301o. (Figure 5-10)

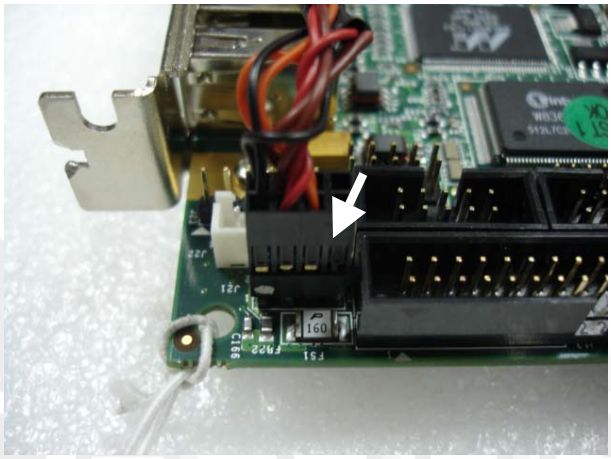


Figure 5-10

Q: OK. I have finished hardware installation, but I got nothing when I power on the system. Why?

A: There are thousands of different reasons to get this power on failure.

1. Check 96M4301o jumper, JP1. Otherwise, incorrect power setting will not allow you to power on the system.
2. Double check if every connector is attached with the correct cable.
3. If you have changed processor with different system clock, please move JP3 (CMOS clear Jumper) to 2-3, power on the system to clear CMOS (move on/off switch from off to on for AT mode, or toggle the switch for ATX mode), power off the system, move JP3 back to 1-2, and power on again. This way to process the action for "Clear the CMOS Setting".

Q: I connect two IDE devices over one IDE flat cable, but the system either does not start, or just hangs from time to time. Why?

A: Make sure that you have configured the two IDE devices as a master and a slave, respectively.

Q: I am using an ATA-66 (or 100) hard drive, how can I know that ATA-66 function is started??

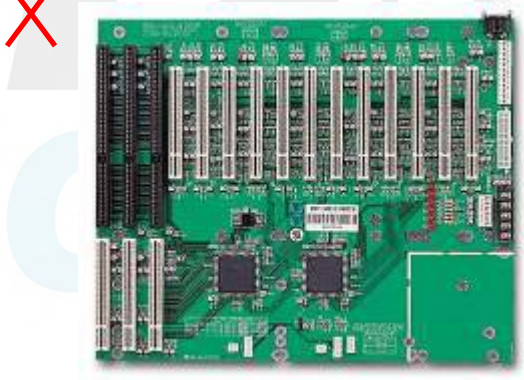
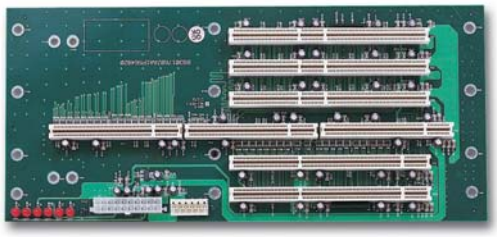
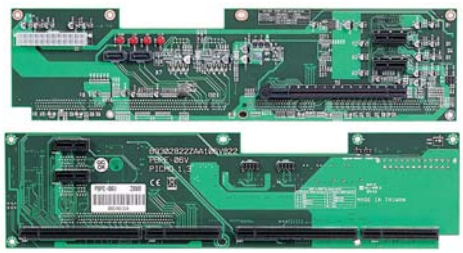
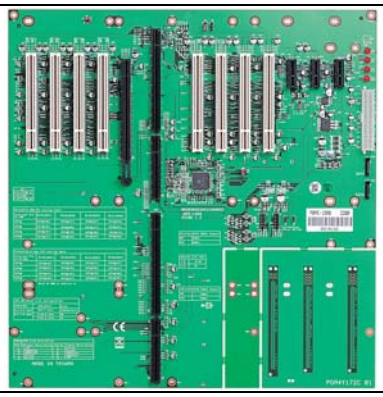
A: You need to use the 80-pin ATA-66 IDE flat cable to have this function ready. During POST, you can see ATA-66 (or 100) message while hard drive is being detected. Besides, after Microsoft series OS installation successfully, you must install ATA-66/100 driver, then the function can be active.

Q: After inserting Compact Flash, why doesn't it work at all?

A: Compact flash is occupied with the master device of IDE Secondary. If there is any device occupying this Secondary IDE Master channel, please remove it or set it as a slave device.

Q: Can I use backplane which follow the PICMG 1.0 specification?

A: No.96M4301o based on PICMG 1.3 , PCI Express and PCI definition. It can't compatibility on the PICMG 1.0 and PICMG 1.2 backplane.

	
PICMG 1.0 backplane	PICMG 1.2 backplane
	
PICMG 1.3 backplane	PICMG 1.3 backplane

5.3 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the device cables required before turning on AT power. CPU, CPU fan, CPU fan power cable, 240-pin DDR2 SDRAM, keyboard, mouse, floppy drive, IDE hard disk, printer, VGA connector, device power cables, ATX accessories or 12V 4-pin power cable are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with 96M4301o, it is recommended, when going with the boot-up sequence, to hit "DEL" key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to "**Load Optimal Defaults**", press "Enter" and "Y" to load in default optimal BIOS setup. This will force your BIOS setting back to the initial factory configuration. It is recommended to do this so you can be sure the system is running with the BIOS setting that DSM has highly endorsed. As a matter of fact, users can load the default BIOS setting any time when system appears to be unstable in boot up sequence.

Auto Detect Hard Disks

In the BIOS => Standard CMOS setup menu, pick up any one from Primary/Secondary Master/Slave IDE ports, and pressed "Enter". Setup the selected IDE port and its access mode to "Auto". This will force system to automatically pick up the IDE devices that are being connected each time system boots up.

Improper disable operation

There are too many occasions where users disable a certain device/feature in one application through BIOS setting. These variables may not be set back to the original values when needed. These devices/features will certainly fail to be detected.

When the above conditions happen, it is strongly recommended to check the BIOS settings. Make sure certain items are set as they should be. These include the floppy drive, COM1/COM2 ports, parallel port, USB ports, external cache, on-board VGA and Ethernet.

It is also very common that users would like to disable a certain device/port to release IRQ resource. A few good examples are:

disable COM1 serial port to release IRQ #4
disable COM2 serial port to release IRQ #3
disable parallel port to release IRQ #7…,etc

Interrupt Request Lines (IRQ)

A quick review of the basic IRQ mapping is given below for your reference.

IRQ#	Description
IRQ #0	System Counter
IRQ #1	Keyboard
IRQ #2	Programmed Controller
IRQ #3	COM2
IRQ #4	COM1
IRQ #5	Multimedia Device (Shareable)
IRQ #6	Unassigned (Shareable)
IRQ #7	Parallel Port
IRQ #8	CMOS Clock
IRQ #9	ACPI Controller (Shareable)
IRQ #10	USB 1.0/1.1 EHCI Controller
IRQ #10	Display Controller
IRQ #11	Ethernet Controller (Shareable)
IRQ #11	USB 1.0/1.1 EHCI Controller
IRQ #12	Unassigned (Shareable)
IRQ #13	Unassigned Data Processor
IRQ #14	IDE Controller (Shareable)
IRQ #15	USB 1.0/1.1 EHCI Controller
IRQ #15	USB 1.0/1.1 EHCI Controller
IRQ #15	USB 2.0 EHCI Controller (Shareable)
IRQ #15	SM Bus Controller (Shareable)
IRQ #15	Ethernet Controller (Shareable)

It is then very easy to find out which IRQ resource is ready for additional peripherals. If IRQ resource is not enough, please disable some devices listed above to release further IRQ numbers. The IRQ list will show on the Post sequences as system hardware checking.

System Memory Address Map

Each On-board device in the system is assigned a set of memory addresses, which also can be identical of the device. The following table lists the system memory address used for your reference.

Memory Area	Size	Device Description
0000 – 003F	1K	Interrupt Area
0040 – 004F	0.3K	BIOS Data Area
0050 – 006F	0.5K	System Data
0070 – 0BE3	45K	DOS
0BE4 – 0E1B	0.9K	Program Area
0E1C – 9D66	573K	[Available]
9D67– 9EFF	6.4K	Program Area
= Conventional memory ends at 636K =		
9F00 – 9FBF	3K	Extended BIOS Area
9FC0 – 9FFF	1K	Unused
A000 – AFFF	64K	VGA Graphics
B000 – B7FF	32K	Unused
B800 – BFFF	32K	VGA Text
C000 – CA5F	41K	Video ROM
CA60– DFFF	86K	Unused
E000 – EFFF	64K	System bios temporary Area
F000 – FFFF	64K	System ROM
HMA	64K	First 64K Extended

Interrupt Request Lines (IRQ)

Peripheral devices can use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

IRQ#	Current Use	Default Use
IRQ 0	SMARTDRV	System Timer
IRQ 1	SMARTDRV	Keyboard Event
IRQ 2	[Unassigned]	Usable IRQ
IRQ 3	System ROM	COM 2
IRQ 4	System ROM	COM 1
IRQ 5	[Unassigned]	Usable IRQ
IRQ 6	System ROM	Diskette Event
IRQ 7	[Unassigned]	Usable IRQ
IRQ 8	System ROM	Real-Time Clock
IRQ 9	[Unassigned]	Usable IRQ
IRQ 10	[Unassigned]	Usable IRQ
IRQ 11	[Unassigned]	Usable IRQ
IRQ 12	System ROM	IBM Mouse Event
IRQ 13	System ROM	Coprocessor Error
IRQ 14	System ROM	Hard Disk Event
IRQ 15	[Unassigned]	Usable IRQ